

# The Iron Age

A Review of the Hardware and Metal Trades.

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## End View of the Exhibit of The Hart, Bliven & Mead Mfg. Co., at the Centennial.

Our illustration this week shows an end view of the Hart, Bliven & Mead Mfg. Co.'s exhibit of hardware in the Main Building (P. 70), near South avenue, Centennial International Exhibition. In our issue of July 6th, under the title of "Hardware at the Centennial," we described in detail their magnificent display of American hardware. The accompanying picture shows the pyramid shaped sample boards of Connell's gong bells, which are placed upon three wings, set on a turn-table which revolves by means of clock work. A limited side view, exposing a portion of the cases devoted to builders' hardware, is also seen, and the elegant finish which is completed by the handsome nickel-plated railing extending all round the exhibit, can be fairly estimated by the view presented in the picture. On the carpeted platform underneath the case they show samples of shovels and tongs, pickers, steelyards, barn door hangers and rollers, plate hinges, nut cracks, iron bench screws, grindstone fixtures, shovel and tongs stands, and irons, fire-dogs in brass and iron, &c. Three cases measuring about 34 feet by 4 feet 10 inches, and containing 36 sample boards completely covered with specimens of hardware manufactured by the company, together with the addition of the pyramid shaped exhibit of Connell's bells, goods attached to the cases and tastefully displayed on the platform underneath, complete the display of articles manufactured by this company. The cases are surmounted with handsome signs carved in solid walnut, the letters cut in panels of French walnut are gilded; between the center and end signs are placed two urns, one lettered B. & M., 1838, date of the foundation of the old hardware house of Bliven & Mead, in New York; the other, J. T. H., 1838, the date of commencement of manufacturing by Mr. J. T. Hart, in Connecticut. Connected with this exhibit, and in style precisely corresponding, is the display of the Brauford Lock Works, for which the Hart, Bliven & Mead Mfg. Co., are agents. They show their goods in two cases occupying 13 feet by 4 feet 10 inches. Between these two exhibits the office of the first named company is located, the whole being in charge of Mr. Charles J. Bliven, general manager of the Hart, Bliven & Mead Mfg. Co. For a full description of this elegantly arranged exhibit, we refer our readers to our issue of July 6th.

## Wheeler's Process for the Utilization of Bessemer and Other Kinds of Scrap Steel.

A very serious obstacle to the profitable use of the different grades of steel scrap has been the necessity heretofore existing for remelting or reconversion, the processes being so expensive as to render the saving over the cost of new material very slight, and hardly to be considered an object by manufacturers.

Bessemer steel, for years after its introduction into general use, presented such difficulties in the way of remanufacture that the scrap was considered as absolute waste—which, taking into account the immense amount of this grade of steel used on railroads alone in the shape of rails, tires, etc., was a source of loss of such magnitude as to induce many costly experiments with a view to obviating it. Although there have been invented numerous processes for the purpose, which undoubtedly economize in the minor points to a considerable extent, yet, as they involve the objectionable and expensive feature of remelting, the percentage of saving must be deemed as comparatively small—this being the case more particularly in the lower grades, but applying more or less to all.

Judging from a large variety of specimens made by a series of processes (each, however, involving the same fundamental principle), invented by Elbridge Wheeler, Esq., of Philadelphia, Pa., the problem would appear to have been successfully solved, and in a manner so simple as to suggest very forcibly a comparison with the anecdote of Columbus' egg, and the whole secret may be contained in a nut shell, or—to carry out the simile—an egg shell. The process consists in simply raising the scrap steel to a welding heat in a crucible of any desired shape, which, while entirely excluding the air and preventing decarbonization and oxidation, is but slightly more refractory than the steel itself, and forms a component part of the mass, and will admit of being rolled or hammered with the latter into any desired shape—still retaining its relative proportion in the bar, and effectually protecting it while reheating even to a welding heat, which may be repeated as often as desired without the slightest deterioration in quality. This last feature greatly enhances the value of the invention, as in all manipulations of the material subsequent to its manufacture it may be treated precisely like iron, welding without the use of flux as readily as the latter either to itself or to wrought iron.

As will be seen from the following description, the plant required is precisely the same as that used in the manufacture of merchant iron, and any mill so equipped can manufacture it as readily and at about the same cost as the best quality of the latter: A wrought iron case made of six separate plates, forming the sides and ends, and fastened together by projections on the latter passing through slots punched in the former and bent or clinched, forms the crucible, into which the scrap steel cut to the proper size is closely packed, and the joints rendered air-tight by a luting of fire-clay.

The steel thus protected may be placed in the ordinary reverberatory furnace and heated to a semi-molten state without the slightest

danger of burning, as the iron casing, being more refractory, retains its shape, and is at the proper heat for working in the rolls, which effectually welds the mass together, forming an iron-coated steel bar, perfectly homogeneous as to the steel, while the iron having absorbed a small portion of the carbon of the latter, is improved in quality to a considerable extent, having greatly increased tensile strength and less liability to fracture in bending.

Independently of the primary consideration—the small cost of production—there are many other advantageous features claimed for this iron-coated steel, among which may be mentioned the following as the most important:

1. While possessing the immense tensile strength of the best qualities of steel (according to a recent test, 126,000 lbs. per square inch), its resistance to fracture from transverse strain is very materially increased, as the iron coating,

from its superior flexibility, prevents the separation of the particles on the surface of the steel at the outside of the bend, the point at which the rupture would necessarily begin. This may be readily demonstrated by taking two pieces of steel—one of the iron-coated and the other ordinary cast steel—of convenient size for bending readily by hand. After being bent double, the latter will almost invariably break upon straightening, while the former may be bent back and forth several times without showing any signs of fracture. The great importance of this feature is obvious, as it overcomes one of the objections to the use of steel for purposes such as bridge work, &c., for which its tensile strength and rigidity would render it particularly well adapted, were it not

little less importance, both by overcoming objections to the use of steel which have heretofore rendered it unprofitable, as well as by extending its field of usefulness by its application to purposes heretofore considered impracticable.

Undoubtedly the most important of these modifications is the application to the manufacture of rails for both steam and street railroads. The T rails are made with a head of the iron-coated steel, upon the top or tread of which the iron is made very thin, gradually increasing in thickness toward the shank, where it forms about one-half the stock, and terminating in the base, which is composed wholly of iron. For this form of rail it is claimed that, while having the hardness of steel for wear on the

bolts and stays, &c., is made with a steel center, occupying about one-third of the bulk, as being the most advantageous combination.

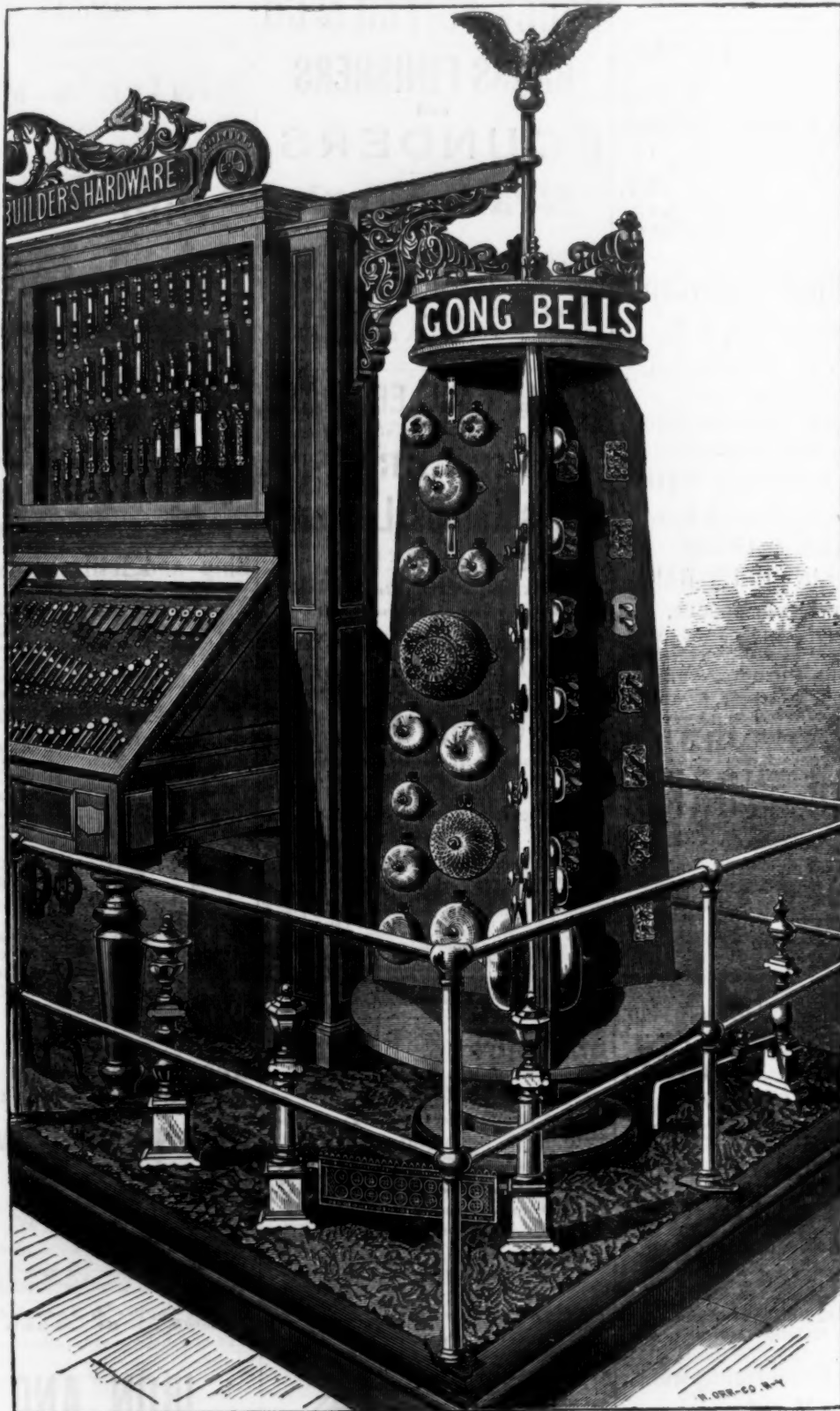
For car axles the bar is made with an iron center, of about one-half the whole diameter, surrounded by two-thirds of the remaining bulk of steel, and the whole encased in an iron coating of the proper thickness to allow of turning off on the journals, and exposing the steel for the wearing surface of the latter. It is claimed for this form of axle that by the alternation of the concentric iron and steel tubes surrounding the iron core, the tendency to crystallization, which usually occurs at the inner end of the wheel bearing, is effectually counteracted.

Another form of bar is adapted to uses for which iron is sufficiently strong, but is objectionable as not presenting as good a wearing surface as steel. For this purpose the outer iron coating is made sufficiently thin to all work off in the finish, leaving the steel surface for wear, while the proportion occupied by the latter in the bar is just sufficient for this purpose, the center being of iron.

In using this form of bar for slide-bars for engines and similar purposes, the steel may be hardened without danger of breakage, and will thus present an excellent wearing surface of great durability. This feature is also claimed for car axles, and, if practicable, is of the utmost value, as overcoming in a great measure the tendency to heating of journals, which is one of the greatest difficulties experienced by train men, and is frequently the cause of accident or detention of trains. One of the most recent of these modifications, is the manufacture of hollow or tubular shafting or axles, for which many points of superiority over the solid bar are claimed. The bar or tube is composed of four rolled segments of the desired thickness, which are held together while being heated for welding, and passed through the rolls, without using the ball process usually employed. The thickness of the segments presents sufficient surface to render a butt weld perfectly safe, and it is claimed to be equal in strength to the lap weld. In making these tubes of steel the iron coating at the edges of the segments is the medium by which the welding is effected. This process, however, is not intended to apply solely to steel tubing, but is equally valuable in making iron tubes of unusual thickness, for hydraulic and similar purposes, which, when manufactured in the ordinary manner, involve great expense. Flanged iron columns are made in this manner, with the difference that instead of butt welds the joint is made on the flanges by passing through compound rolls, each pair of which welds the two opposite flanges.

If, as appears to be the case, the inventions are what is claimed for them, they are of great value, and ought, ere long, to be generally adopted. The exhibit is made by the "American Tubular Iron and Steel" and "Pennsylvania Combined Iron and Steel Associations," and may be seen in space D. 4, col. 28, Machinery Hall.

The German iron trade has now got into such a state that the Prussian government has found it expedient to invite the Chambers of Commerce to furnish it with quarterly reports on the condition of the industry. One of these documents has just been issued by the Duisburg Chamber of Commerce, in which they comment upon the iron trade in Westphalia. The report is now in the hands of the Prussian Minister of Commerce, and it will, no doubt, receive from that functionary all the attention which it deserves. We gather from the report that even though manufacturers have considerably curtailed their means of output, yet the difficulty of keeping employed their present number of workpeople does not diminish, but rather increases, and the entire out-turn can only be sold at prices which do not cover first cost. Following the example of their English counterparts, iron-masters have blown out important furnaces, and the stopping of others is contemplated. The Duisburg Chamber have taken the trouble to present to the government, in tabulated form, a comparison of prices as they now stand with those ruling in 1869. From this statement it appears that while the quotations for coal are still about 25 per cent. higher, those of puddled iron are about 10 per cent. lower than in the year referred to. The Chamber declares that the keeping on of mills and forges in Westphalia results in an actual loss to the proprietors, for while in favorable instances the prices obtained for their products cover the cash outlay in materials and wages, and a portion of the interest on invested capital, nothing is left for depreciation account, repairs, and the like. Thus sad depression in the trade of Germany is not confined to the major industry of iron making. The foundries are visibly affected by it. As compared with former years, the foundries of the Lower Rhine districts are now turning out less by 200,000 kilos. monthly; for whereas in former years they sold with ease an average monthly supply of about 350,000 kilos, only about 84,000 kilos a month are now produced. The rolling and machine works, too, are reported to be in a correspondingly unfavorable condition as to the receipt of orders.



END VIEW OF THE EXHIBIT OF THE HART, BLIVEN & MEAD MFG. CO., AT THE CENTENNIAL.

that its "cold short" properties make it unsafe.

2. Forgings may be made from the combination bar about as cheaply as from iron, as by allowing of the same degree of heat, it will work quite as easily. This is especially valuable in making drop forgings, horseshoes, and articles of small size, which, to be made cheaply, will not admit of taking any unnecessary heats.

3. The protection afforded by the iron allows of giving the full degree of hardness to the steel without danger of fracture. A specimen for illustrating this point is a plate of 5-16 inch thickness, intended for the manufacture of burglar proof safes, and is of necessity of sufficient hardness to resist the most effective drills.

From the original process—i. e., protection of the steel while heating—have resulted many modifications, which would appear to be of but

tread, it has also the toughness of iron to resist fracture, which, as the cost is but little more than that of iron rails, appears to render it very desirable. A sample rail is exhibited which has seen two years' service on one of the New York roads, and is still in excellent condition, showing very slight amount of wear.

For street roads, also, on which at present iron rails are universally used, the steel capped rails would seem to be very desirable. These are made of the ordinary form, and have the whole upper surface covered with a sufficiently thick plate of steel to resist the tendency to wear caused by the continuous travel of a large city.

In addition to the merchant bar iron-coated steel, special forms may be made at the same cost, the modifications being made in the construction of the fagot. Bar or rod for set screws, chain cables, car couplings, bridge



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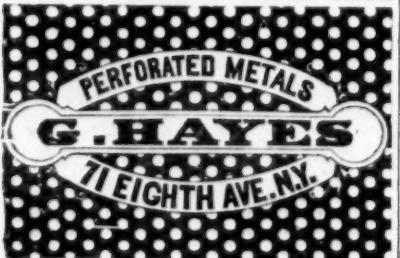
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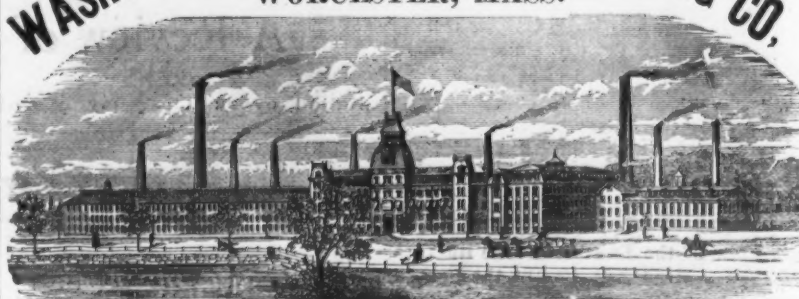
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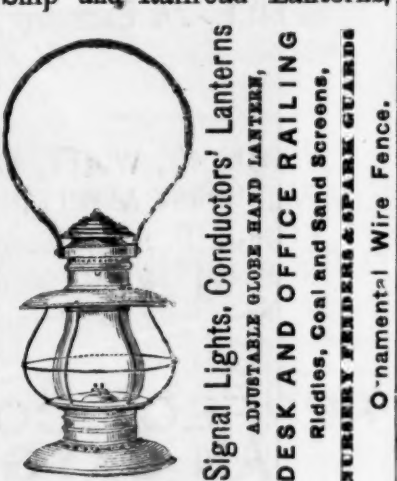
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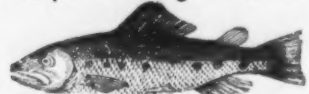
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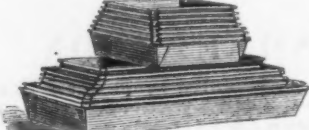
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and Tank Iron, and Nails.

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Manufacturer of

**GONG BELLS.**

Steamboat and Locomotive Gongs kept on hand. A  
liberal discount to the trade. Bell Hanging and Jobbing  
done to order. 4 DUANE STREET, N. Y.

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**Manila Pails**

REDUCED TO \$7.50 PER DOZ.

These goods we warrant not  
to be affected by climate, or  
water, hot or cold.  
Are Durable, Light, Strong  
and Tasteless, have no  
hoops, and will not absorb  
their contents. Orders from the  
trade solicited.  
For circulars and terms, ad-  
dress,

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Manufacturers' Agent,  
280 PEARL ST., - - NEW YORK.

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**Gilbert & Bennett Mfg. Co.,**

GEORGETOWN, CONN.,

MANUFACTURERS OF

**Iron Wire, Curled Hair**

**AND GLUE.**



**Gilbert's Rival Ash Sieve.**

**UNION METALLIC CLOTHES LINE**

**WIRE.**

The highest price paid for Cattle's Tails and Hog's Hair

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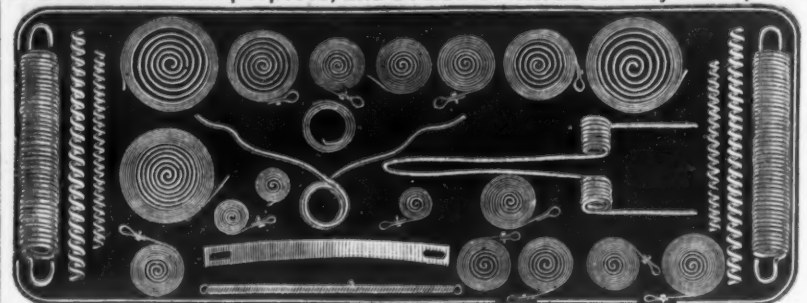
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**Blatchley's Horizontal**

**ICE CREAM FREEZER**

(Tingley's Patent)

For Saloons, Hotels, Families  
and Ice Cream Manufacturers.  
In the economy and  
perfection of its work, is ex-  
ceedingly unequalled. The  
closed head will save ice  
enough in one season to pay  
for the machine. The tub  
requires but one filling to  
freeze. Size, 8 to 40 quarts.  
Visitors are cordially invited, when in town to the Big  
Exhibition, to come and see us, or send for descriptive  
circular and price list. Very liberal arrangements  
made with the trade. The machines can also be seen at  
the Centennial Exhibition, Agricultural Hall, Cor.  
Aisles 9 and 10, Column letter O, No. 10.  
C. G. BLATCHLEY, Manuf., 508 Commerce St., Phila.

CARY & MOEN,  
Manufacturers of  
STEEL WIRE for all purposes, and STEEL SPRINGS of every description.

Market Steel Wire, Crinoline Wire, tempered and covered.  
Also Patent Tempered Steel Furniture Springs, constantly on hand.  
234, 236 and 238 West 29th Street, NEW YORK.

## The Faultless Fruit Can.

PATENTED.



The perfection of this article, in all of the essential points of a good  
fruit preserver, has been thoroughly demonstrated by the immense num-  
ber sold. The demand increases, but with largely increased facilities we  
shall be able to meet the wants of the trade. As the can tapers slightly  
when made up, they nest together, thus saving space greatly. The  
opening is the full size of the top of the can, admitting of perfect clean-  
ing and drying; and so making them much more durable.  
When not in use for Fruit they make a very nice receptacle for Tea,  
Coffee, Spices, etc., the close fitting cover making it air-tight.  
Another important feature is the labeling device, whereby the con-  
tents of the can, date, and method of preserving are easily shown.  
We furnish the complete trimmings for the FAULTLESS CAN,  
including the body all ready for soldering, at the following very low prices,  
viz.:  
\$8.50, 1 qt.; \$10.50, 1 1/2 qts.; \$12.50, 2 qts. per gross.  
Cans made up ready for use:  
\$9.75, 1 qt.; \$11.75, 1 1/2 qts.; \$13.75, 2 qts. per gross.  
We would caution dealers against an imitation of our can having a  
"swell" or "pead" near the top to prevent the cans sticking together when  
nested, as this feature is covered by our Patents.  
The Trade only supplied.  
Use good Sealing Wax for this, and all other cans, to secure good  
results.

**F. STURGES & CO., Sole Manufacturers,**  
72, 74 & 76 Lake Street, CHICAGO.

## SCHIERLOH MFG. COMPANY,

Sole Manufacturers of



## Cherry Heat Welding Compound.

OFFICE, 24 Exchange Place, Jersey City, N. J.

This compound is put up and warranted genuine only in 1, 5, 10, 50 and 100 lb.  
packages, and can be obtained from the manufacturers direct, or from the following  
General Agents at manufacturers' prices, in large or small quantities:

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**PARKHURST & WILKINSON, Chicago, Ill.**

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It is also for sale in 1, 5 and 10 lb. packages by Hardware Dealers generally through-  
out the country.

PERFECT COMBUSTION BY  
AN OXYGEN BLAST.

By this process oxygen is imparted to the blast simply by its passage, on its way to the place of combustion,  
through a chamber or vessel holding an oxygen compound, from which, by the agitation of the air thereon, oxygen  
is set free and thus imparted to the blast. The required volume of this blast is one-half less. The combus-  
tion becomes perfect therefrom, all the carbon in the fuel being converted into a high and concen-  
trated heat, without smoke or gas, but that of carbonic acid, being formed. Beside a saving of fuel,  
obtainable in all cases by this blast, advantages arise from it varying according to the appliance of the heat.  
—On Forge Fires it gives a clean and intense heat, free from all sulphurous gas, whereby a better and  
quicker welding is had and time saved. On fires under boilers for making steam, the saving in fuel is 25 per  
cent. and over, the working capacity can be increased in same ratio by reason of the intensified and accel-  
erated combustion, which latter also overcomes the disadvantages connected with the use of fine dust  
and impure coal. Castings from a cupola in which the fire is sustained by this blast become of superior  
quality, uniformly soft to work and very tough, resembling wrought iron and steel; they forge hot  
and cold to some extent; the iron becomes strengthened and purified, being freed from carbon and sul-  
phur. For blast furnaces this process becomes of vast importance—it saves fuel, increases the work-  
ing capacity, perfects and reduces the cost of the metal, makes sulphurous and other impure ores fit for  
use. The serious drawbacks arising from imperfect combustion, caused mainly by otherwise uncontrollable at-  
mospheric influences, are overcome. The work of a puddling furnace and that of decarbonizing the iron,  
both for wrought iron and steel purposes generally, is much simplified, shortened and perfected as to pur-  
ity of product; the work of so many hours is reduced to as many minutes by this process. The process  
has the merit of being simple and easily applied, and with but very little expense, and this only for the  
needed chamber or vessel and its connection with the blast pipe; the vessel may be a wooden keg, barrel or  
copper tank or tank, properly lined, from two gallons for a single forge fire up to 500 gallons and over, according  
to the blast in use. The cost of the oxygen is conditioned by, and made subject to, its effect—it is but a small  
item compared to the gains from it. Although this process has been in practical use for over a year,  
the inventor felt reluctant to offer it to the public before having its utility and practicability fully estab-  
lished, beyond any and all contingencies, not from a theoretical standpoint, but from the testimony of man-  
ufacturers who have used the process this last year, and whose standing and reputation as manu-  
facturers are of the highest order, and such as to entitle them to the consideration of others. For  
further information, and for small specimens of castings from this process, address

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## O. LINDEMANN &amp; CO.,

Manufacturers of  
JAPANNED AND PATENT BRIGHT METAL

**Bird Cages.**

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**FIRST MEDAL**

at the  
**World's Exposition of Vienna,**

1873.

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Factory,  
Nos. 252, 254 & 256 Pearl Street,

NEW YORK.

Importers of GERMAN TEA TRAYS in  
four colors. Catalogues and Price Lists  
furnished to the Trade only.



## Civil Engineering at the Centennial.

NO. II.

The Netherlands give greater prominence to  
civil engineering exhibits than any other coun-  
try. Adjoining the principal avenue in the  
Main Building, a structure consisting of a  
central column with radial wings is erected,  
upon which are displayed drawings of some of  
the wonderful engineering achievements of  
this "land below the sea." Some of these  
drawings are very large, and attract attention  
from those not specially interested in this  
branch of science. In the space between the  
wings, and in proximity to the structure, are  
arranged models, relief plans, stands of photo-  
graphs and albums.

The navigation between Rotterdam and the  
North Sea is shown by a large plan of the new  
channel and detailed drawings of the jetties.  
The construction is exemplified by models of  
fascines, mattresses and crib work, and a relief  
plan model of the southern jetty at the Hook  
van Holland. There are also plans and sections  
of the sea embankments of North Holland; a  
number of charts explaining the methods of  
protecting river banks, profiles and sections of  
dams across the Schelde Sloe and other  
streams; plans of the Flushing Harbor, and  
many other interesting features.

The collection of photographs is quite large,  
and is so arranged upon revolving stands that  
each can be inspected. The wonderful pump-  
ing works constructed for the reclamation of  
the Harlemmer Meer is presented to notice  
by plans of the remarkable engine employed,  
drawings of the buildings, dykes, etc.

A very fine model of half of the large span  
of the arched truss bridge at Keulenbergh, and  
a large drawing of the complete bridge, occupy  
very prominent positions. This bridge is 665  
meters, or four-tenths of a mile long. The  
model has mirrors so placed that in looking  
into the bridge the whole span is seen. This  
span is 490 feet long. Plans and details of a  
swing bridge over the North Holland Canal, an  
iron crane bridge over the Ligne, and a steel  
swing bridge 95 feet long, are exhibited.

Of the canal system of Holland there is much  
of interest exhibited, including details and  
models of locks, plans, maps and sections of  
the canals from Amsterdam to the North Sea;  
drawings of the William III. Locks; section of  
breakwater; details of pneumatic foundations,  
pumping apparatus, construction of break-  
waters, &c.

A surface model of the Zuider Zee, showing  
the complete topography and hydrography of  
North Holland, and portions of the provinces  
of Friesland and Gelderland, bears upon it the  
legend:

"Haarlem lake is drained,  
And drained is the Y;  
If peace is maintained,  
Zuider Zee gets dry."

The truth of this prophecy is demonstrated  
by the model and accompanying maps, de-  
scriptions and reports. The reclamation of the  
Zuider Zee would be but a repetition on a  
grand scale of the wonderful work done on  
the Haarlem Lake, and, in fact, throughout the  
whole of North Holland.

The changes wrought by nature and by man  
are admirably illustrated by two maps, one  
showing North Holland in 1575, the other North  
Holland in 1875. In these 300 years the North  
Sea and the Zuider Zee have encroached con-  
siderably on the mainland; but this encroach-  
ment has been largely checked by the construc-  
tion of dykes and breakwaters. The numerous  
lakes and ponds in the interior, which are  
prominently shown on the map of 1575, have  
given place on the map of 1875 to reclaimed  
farming land, snatched by pluck and per-  
severance from under the sea. The denudation  
and protection of the North Holland coast is  
illustrated by some interesting drawings.

Bostonians are startled to find in the Nether-  
lands another "hub," and Chicagoans gaze in  
wonder at the new railroad center in the  
Netherlands, as exemplified by a map  
showing Vlissingen or Flushing as a re-  
markable commercial point, with railways  
diverging in all directions; leaping over seas  
and bays to Stockholm, Christiania, Copen-  
hagen, Edinburgh, London, Liverpool, Dublin;  
or climbing over mountains to Vienna, Rome  
and Constantinople. The through line to Lis-  
bon passing Brussels, Paris and Madrid would,  
in its directness, put to blush some of the  
American railway maps.

In connection with the special displays a large  
topographical map of the Netherlands is of  
great interest, for on it are shown all the rail-  
roads, canals, etc.; and prominent bridges and  
other engineering works have their locations  
marked with letters.

The harbor improvements at Harlingen are  
represented by two models of the breakwater  
piers, drawings and sections of the embank-  
ments, and a fine album of photographs illus-  
trating the progress and difficulties of construc-  
tion. The long bridge (nearly 4800 feet) over  
the Hollandsche is shown by a very fine painting  
and detailed drawings. And a handsome  
swing double crane bridge on the Amster-  
dam and Rotterdam Railway is illustrated by  
an elaborated model and by drawings. There  
are also very pretty models of several auto-  
matic lock gates, a dredging boat, a Dutch  
swipe bridge, and others showing the construc-  
tion of locks.

An interesting album of pen drawings of the  
water supply of 's Gravenhage describes the  
construction of buildings, details of pipes, etc.  
A peculiarity is a large tank supported upon  
ornamental masonry around the circumference,  
the bottom being dished toward a stand pipe  
which rises in the center.

The Waterstaat engineers have a large al-  
bum, giving in detail the features of the various  
districts, and two large portfolios filled with  
illustrations of noted bridges and other en-  
gineering structures.

Altogether, the Netherlands display of en-  
gineering works is wonderful, and when we re-  
member that all these bridges, canal dykes,  
dykes, etc., are located in a kingdom covering  
little more area than the State of Maryland,  
and most of them in a district of one-fourth  
that size, we can imagine the difficulties over  
which the Hollanders have risen. To-day there  
are more people residing in the Netherlands  
than in the State of Pennsylvania, for whose  
convenience these bridges and canals are kept  
up, and for the protection of whose lives and  
properties the systems of dykes are maintained.

There is much for us to learn from this dis-  
play upon a subject too much neglected in this  
country. The reclamation of marshy and  
swampy ground, much of which is worthless,  
except for the propagation of frogs and mala-  
ria, could by judicious engineering construc-  
tions be made into valuable fertile land, and in  
many instances pay a very large profit upon the  
outlay.

**New Rays of Calcium.**—Mr. Lockyer, in  
a letter to M. Dumas, says: I have recently car-  
ried out a series of experiments upon calcium,  
employing at first a small battery and a small  
coil, and afterward a large battery and a large  
coil, and to avoid all doubts I photographed  
the results. I found that with the small coil I  
was able to obtain a photograph which only  
contained the ray in the blue, without any trace  
of the ray in the violet; and with the largest  
battery and the largest coil I obtained a photo-  
graph containing the rays of the violet without  
any trace of the ray in the blue, and that by  
varying the surface of the battery I was able to  
get a spectrum resembling the absorption spec-  
trum of calcium in the sun. These results  
agree so completely with those of the dissocia-  
tion of a salt of calcium that I have asked my-  
self the question if we have not here before us  
a dissociation of the calcium itself. Naturally  
we are unable to determine, for the present,  
whether we have a lower molecular group of  
calcium, or whether the calcium itself is a com-  
pound of two distinct subelements, if the ex-  
pression may be used. It seems that we can  
only undertake to solve this question by photo-  
graphing the rays of the calcium (H, H<sub>2</sub>) in  
different stars. If we find that they present  
always the same relative breadth and intensity  
there will be a strong presumption that we have  
met with a decomposition of calcium, or, in  
other terms, we shall have shown that a spec-  
trum of rays is a spectrum due to different  
orders of molecular grouping. If, on the other  
hand, we find that these lines vary in breadth  
and in intensity, it will be difficult to explain  
this phenomenon except we admit that calcium,  
instead of being an element, is really composed  
of two substances.—Comptes Rendus.

## The English File and Edge Tool

**Trades.**—The Ironmonger says: The houses  
in these branches, whose business has been  
chiefly with the United States and Russia, have  
scarcely ever been worse off for orders than  
they are at the present time. There should  
have been during the past two months a large  
influx of orders, in anticipation of the next  
fall trade, and upon them men could be kept  
employed in the early summer months. The  
time, however, has passed, and very few  
orders, indeed, have come to hand from either  
country, and the firms who have been waiting  
for them have had to put their men  
on still shorter hours. The continental  
houses are rather better employed, and  
there are exceptional instances in which  
orders are in arrears. The file men at  
one house are on strike against a reduction of  
wages. The home trade for files and edge  
tools is moderately good, and the joiners' tool  
makers state that they have no reason whatever  
to complain. They are in receipt of very good  
orders, and are doing a fair business. In the  
saw trade the position of things is being re-  
versed. Formerly, we supplied America with  
saws; now manufacturers there have not only  
secured almost complete monopoly of their  
own markets, but they are sending their goods  
here in large quantities. There are only about  
two Sheffield houses who are now sending saws  
to America; but several here are buying from  
them, as they can do so on more advantageous  
terms than they can produce the goods them-  
selves.

The Officers of Machinery Hall, Cen-  
tennial Exhibition.

The following list will be found convenient  
for reference by exhibitors in Machinery Hall:  
John S. Albert—Chief of Bureau of Machinery  
Hall.

Nahum Stetson—Secretary.  
J. G. Sanjerson—Volunteer aid.  
Friedrich Ungever—Volunteer aid.  
Lewis W. Robinson—Superintendent in charge  
of office.

Henry Fourfax—Engineer.  
Joseph Hirst—Superintendent in charge of  
Machinery Building.

G. H. Woods—Engineer in charge of south-  
east section of Machinery Building.

Wilson K. Park—Engineer in charge of  
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George H. Hubbard—Engineer in charge of  
southwest section Machinery Building.

Philip Vorhee—Engineer in charge of north-  
east section of Machinery Building.

John Cotter—Engineer in charge of hydraulic  
anneX.

James L. Hodson—Engineer in charge of  
shafting.

John T. Hawkins—Superintendent in charge  
of all buildings south of but connected with  
Machinery Hall.

Philip Fistor—Engineer of the same.

William A. Dripps—Superintendent of all  
buildings west of but connected with Machinery  
Hall.

John D. Curtis—Engineer of the same.

L. D. Norton—Superintendent in charge of  
all boilers and steam pipes.

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Leather Building.



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**WIRE and**  
**Black and Tinned Rivets**  
OF CHOICEST CHANCELL IRON.  
Rivets any diameter up to 7-16 inch and ANY LENGTH  
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 Extra quality small Rods, from best selected Scrap Iron.  
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provement in machinery and process of manufacture  
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sidered, at lowest market rates.

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of the Company, and the enviable reputation  
they have established for "CAMBRIA RAILS,"  
are deemed a sufficient guarantee that purchasers can,  
at all times depend upon receiving rails unsurpassed  
for strength and wear by any others of American or  
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Planished Sheet Iron.

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Guaranteed fully equal in all respects to the

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**DECK BEAMS, CHANNEL, ANGLE AND T BARS**  
curved to template, largely used in the construction of Iron Vessels.

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For Conversion into Cast Steel.

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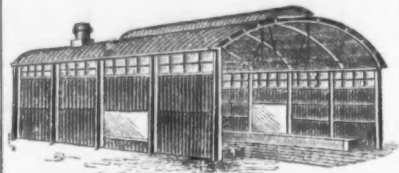
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Bands, Scrolls, Horse Shoe Bars, Nut and  
River Iron, Spike Rods, Shattling, Bridge  
Bolts, Ovals, Half Ovals, Half Rounds, &c.

**Notice to Manufacturers of**  
**Fruit Can Trimmings.**

The superior quality and cheapness of the produc-  
tion of my **PATENT FRUIT CAN TRIM-  
MINGS** (Patented April 6, 1875), having induced  
certain parties to infringe my patent, I have com-  
pelled them to cease manufacturing, and I will pro-  
ceed against any one who may infringe in the future.

**The Very Best**  
**FRUIT CAN TRIMMINGS,**

(3 1-2 Inch Opening),

Are manufactured under process patented April 6,

1875, at the

**WOODBURY STAMPING WORKS,**  
**WOODBURY, N. J.**

I am making arrangements to the end that at least  
one prominent house in all the principal cities of the  
United States will keep a supply of my trimmings,  
for the trade.

**J. M. PATTERSON,**  
Sole Manufacturer,

**WOODBURY, N. J.**

Samples furnished free upon application ac-  
companied by business card.

**JOHN CARVER,**

Manufacturer of

**Caulking Irons,**

**COTTON, FREIGHT & Hay Hooks, &c**

288 Monroe Street, NEW YORK.

With Diagonal Saws.

4 Sizes.

Sold by Hardware Trade.

**LANGDON MITCHELL CO.,**  
Send for Circular. Millers Falls, Mass.

## American Steel at the Centennial.

The history of the manufacture of cast steel  
in the United States is a record of constant  
struggle, not only with the difficulties neces-  
sarily attending its manufacture, and the lack  
of skilled workmen, where skill was such an im-  
portant factor in success, but also with a prej-  
udice against American steel that in many cases  
has been without just grounds. In every strug-  
gle, though the result may have been doubtful  
for a while, complete success seems to have re-  
warded the persistent efforts of our manufac-  
turers. The prejudice, which was the most ob-  
stinate bar to success, is largely removed. Con-  
sumers of steel who three years ago denied most  
positively that they used, or could use, American  
steel, and published that they used English steel  
exclusively, now do not hesitate to own that they  
use American steel, and place their products on  
exhibition with displays of the products of  
American mills. It is to the energy and courage  
of a few men, principally in Pittsburgh, that  
this result is due. Works were built at a large  
expense, costly experiments undertaken, skilled  
labor brought here by offers of large wages,  
and, after years of trial and the expenditure  
of millions of dollars, our steel makers solved  
the mystery, and made the fabrication of steel  
in America an assured success. This is not  
mere assertion, but facts prove it true. There  
is no better evidence of the value of a thing  
than its use, and when the use of foreign steel  
grows less yearly, and the production and con-  
sumption of American increases, it is good proof  
that consumers regard the latter as at least  
equal to the former, and, if we consider the prej-  
udice, we should be inclined to say a little  
better. To show the relation imports and pro-  
duction bear we give the following tables. The  
figures of imports are from the United States  
Navigation Reports. We are without figures  
showing the number of tons import in 1875,  
but the value is one-fifth less than in 1874:

|      | Imports of<br>American<br>Steel Mills. | Tons.  | Value.  |
|------|--|--------|---------|
| 1872 | 32,169                                 | 40,000 | \$1,373 |
| 1873 | 31,373                                 | 53,000 | \$1,842 |
| 1874 | 13,842                                 | 49,681 | \$1,088 |
| 1875 |  | 61,088 |         |

We think words would fail to make the table  
any more significant. They show that the de-  
creased imports are not due to a decrease in  
consumption, but that the falling off in imports  
has been met by the productions of American  
steel manufacturers. This is, however, indirect  
evidence. The absolute test of American steel  
side by side with foreign is the best evidence,  
and fortunately we have this, and it shows con-  
clusively the superiority of the former. It was  
after tests of this kind that the Secretary of the  
Treasury issued his order, some two years ago,  
to use nothing but American steel on the pub-  
lic works. The writer, in conversation with the  
contractor on the Bergen tunnel, was told of  
tests made in drilling the hard trap rock of the  
tunnel, which proved greater wearing qualities  
and at the same time greater ductility and  
toughness. In the office of General Newton,  
in charge of the Hell Gate works, we received  
the same report. One of the greatest triumphs  
of American tool steel is in its use for section  
knives for reapers and mowers. Three years  
ago all of the steel used for this purpose was  
imported. Now the largest manufacturers of  
this class of goods are using American steel  
with perfect success. The writer has seen a  
letter, not written to a manufacturer of steel,  
but to a consumer, in which a manufacturer of  
section knives states that he is now using  
American steel exclusively, that it showed great  
uniformity, evenness of temper, and carried a  
stronger edge and made a better sickle knife  
than several foreign brands which were men-  
tioned, and which are the best known. This  
was said after testing the American and foreign  
steel in the same sections. These examples  
might be given almost indefinitely, but it is  
sufficient to say that almost without exception  
the leading consumers of high grade steel are  
using American brands. We believe that  
there is a future for American steel, and we  
base this belief not so much on the past as  
upon the character of our iron. While so  
much is said about the use of Swedish iron in  
steel making, it is well known that even in high  
grade steel these are only used as mixtures,  
and skill in steel manufacture being equal, the  
country which has the best iron to mix with  
the Swedish will make the best steel. With  
the fine, pure, charcoal iron of this country,  
at the price they can be offered in the future,  
we can have as a base for mixture what no  
other country can approach. To-day in our  
common steels, in which little or no Swedish  
iron is used, American steel is confessedly su-  
perior to all others. And, under the conditions  
we have indicated above, this country must be  
the steel producing country of the world; our  
supply of charcoal iron will force it, and cap-  
ital invested in steel works must, as it is already  
intimated it will be, be invested in this country.  
In view of the facts given above, the American  
steel exhibits at the Philadelphia Exposition  
become something more than a mere array of  
bars and sheets. To ourselves they are an  
earnest of the future; to our visitors they mark  
a progress that must be surprising. In his re-  
port of the Paris Exposition, Mr. Hewitt writes,  
in regard to the iron and steel exhibits of this  
country: "The only proof of the existence of  
any manufacture of steel in the United States  
was contained in a case of very beautiful spec-  
imens contributed by Park Bros. & Co., of Pitte-  
burgh, for which they received a silver medal."  
SINGER, NIMICK & CO.,  
of Pittsburgh, make a very fine display at T. 60,  
Main Building, consisting of saw, tool, plow,  
machinery, safe and boiler steel, and steel rail-  
way axles and springs. This firm make a  
specialty of saw steel, with which they have  
been particularly successful. A band saw  
made of their steel, shown at the Cincinnati  
Exposition of last year, was pronounced equal  
to the best French saws. They have had the

trade of the country largely in saw plates other  
than circular, and have been for years crowd-  
ing out of the market the circular saw plates of  
foreign manufacturers. This firm own the ex-  
clusive right for the United States to the use of  
the Lanth 3-high rolls for rolling steel, which  
they claim gives their sheet steel a superior fin-  
ish and quality. These works were established  
in 1845, and cover at present 10 acres of ground.  
They make all grades of steel except Bessemer,  
viz., blister, German, crucible and Siemens-  
Martin, being the only manufacturers of the  
latter, except for castings, in Pittsburgh. In  
addition, they are extensively engaged in the  
manufacture of springs and axles, having a ca-  
pacity monthly of 40 to 50 tons of springs and  
100 tons of axles. They also manufacture agri-  
cultural steels in a large variety, and show some  
fine specimens of plow steel, and some finished  
rolling plow colters, with patent screw hubs  
attached.

The display of

HUSSEY, WELLS &amp; CO.,

of Pittsburgh, at T. 60 Main Building, is not  
only a most complete exhibit of the productions  
of this well known firm, but also one of the  
most attractive steel exhibits in the Exposit-  
ion. The sheet steel for mower and reaper  
knives is especially noticeable for its beautiful  
surface and its excellent quality. This firm,  
while not the oldest steel manufacturers in the  
country, was one of the first to engage in the  
manufacture of high grade cast steel. It was  
organized in 1858, and commenced operations  
in 1859. The express purpose had in view  
in starting these works was the manufacture of  
steel for edge tools. The utmost caution was  
used from the first, and nothing was left un-  
done that ingenuity could suggest or money  
could procure to make the venture successful.  
During the first three months but 10 tons of  
steel were made, and in the first 15 months but  
280. The placing of this amount upon the mar-  
ket, small as it was, was a genuine sensation,  
and though attempts were made to underrate  
it, prices of steel fell considerably during the  
first year, although they made but a ton a day.  
The effect of this mill in keeping down prices  
during the war was surprising, and the officers  
of the United States government declared  
that it saved the country many thousands  
of dollars in the price of steel. The homogene-  
ous steel for boiler plates shown in the exhibit  
are worthy of more than a passing notice. It  
is well known that the experience in this coun-  
try and Europe, especially in England, in the  
use of steel in boilers and fire-boxes is totally  
different. In Europe it is regarded, for the  
most part, as uncertain and unreliable for these  
purposes, while in this country the very best  
results have followed its use. The reports re-  
ceived by the American Master Mechanics' As-  
sociation is largely in favor of steel, and for  
locomotive and river boilers it is fast tak-  
ing the place of iron. The reason of the  
different experience here and abroad is not  
difficult to find. To make a boiler plate the  
carbon must be reduced to a minimum, and the  
tensile strength still be high. With our pure  
tough charcoal pig irons this is possible, and  
in Europe, with the irons at command at a price  
that would enable the manufacturers to make  
plates at a profit, it has not been. It is to this  
firm that we owe the first successful manufac-  
ture of homogeneous steel boiler plate. Their  
first experiments were a failure, through lack  
of proper machinery, but having, in 1865, put  
in a new plate mill, with all improvements, its  
manufacture became a decided success, and  
from that time it has been a leading feature of  
their production, constantly increasing in  
quality until some of the reports made of this  
steel are most marvelous. We have referred to  
the sheet steel for mower and reaper knives. It  
has been in this grade of steel more than any  
other that our manufacturers have failed.  
Some two or three years since Messrs. H. W.  
& Co. put in their works one of the best and  
most complete sheet mills in the country, de-  
termined to produce an article for this purpose  
that should take the trade. The samples on  
exhibition and the orders received show how  
great has been their success. In addition to  
these, the leading features of their production  
are tool and spring steel, steel for railway sup-  
plies and steel for agricultural implements.  
During the war a large amount of their steel  
was used by the Ames Manufacturing Company  
in sabers, &c., and Mr. Ames testified before a  
committee of Congress that the loss had been  
less than two per cent., which was a much  
better result than he had ever attained with the  
best English steel. In Machinery Hall, at the  
exhibit of A. French & Co., is a 36 inch triple  
elliptic spring of 6 leaves, made from their  
steel, which has been put in a hydraulic  
machine and shut up band to band 52  
times under a pressure of 95 tons, and the per-  
manent set does not exceed 1-64th of an inch.  
The plant consists of six pairs of 24 pot Siem-  
ens furnaces, 36 coke holes, three sheet mills,  
two 16 inch trains and one 18 inch, one 26 inch  
plate mill, one 12 inch rod mill, one 9 inch  
mill, two 16 inch bar mills, one 3 high 16 inch  
forge mill, 13 steam hammers, one helve ham-  
mer, 16 puddling furnaces, cold saw and the  
other necessary tools for working steel.

Messrs. Hussey, Wells &amp; Co. are the largest pro-

ducers of cast steel in the country, making in

1873, 6167 tons, valued at \$1,350,000.

The display of

MILLER, METCALF &amp; PARKIN,

at T. 60, Main Building, is most complete,

showing not only the regular products of their

Crescent Steel Works, at Pittsburgh, but also

displaying a great variety of articles made from

the steel. The shelves and inclosure of the

exhibit are both appropriate and unique. The

display shelves are of planished steel, the steel

supports being encircled with clock spring

steel. The fence railings are planished steel

tubes, welded by Morris, Tasker &amp; Co., and the

posts are formed of car springs and large steel

tubes, surmounted by hammers and nuts se-  
cured by Verona nut locks. A flag staff com-  
posed of a strip of clock spring steel, coiled,  
3 1/2 x No. 35, W. G., and 125 feet long, stands  
in the inclosure. The whole of the above is

constructed of their steel. The display proper  
shows all the forms of hammered bar steel, in  
sizes from 6 inch octagon, 8 feet long, down  
to 1/2 inch square; special rolled bar  
steel; cold rolled planished sheet steel, and  
samples showing bar steel fractures and tests.  
That portion of the display showing the various  
uses to which the steel is put is very complete,  
there being exhibits from 31 different parties,  
showing almost every class of tools into which  
steel enters, from the finest dental tools and  
cutlery, up to solid steel rolls for mill use, and  
the heavy tools for drilling oil wells. This part  
of the exhibit is very significant. The years  
are but very few since a worker of edge tools  
would not have dared own that he used Ameri-  
can steel, but here some of the most prominent  
manufacturers allow it to be announced  
where the whole world can see that they  
use this once tabooed product. Of the qual-  
ity of this steel some good proofs are given  
in the exhibit of special tools that have  
seen service. Here are large solid steel taps,  
from the Keystone Bridge Company, weighing  
over 200 lbs. each, which shaped on St.  
Louis bridge work, and tapped 120 cast steel  
nuts 12 1/2 inches long, 40 nine inches long, 48  
iron nuts 12 1/2 inches long, and 16 nine inches  
long, 155 feet of thread in steel castings, and  
62 feet in wrought iron. The same company  
contribute a large reamer in good condition,  
that has bored 378 holes in cast iron with 1/2  
inch feed. The National Tube Works show  
large and small milling cutters, one of which  
has cut ten 1 inch and one 8 inch taps, and an-  
other one 10 inch, and four 8 inch steam pipe  
dies, and two 8 inch coupling taps, and are in  
good working condition yet. In addition there  
are drop dies that have formed 30,000 diffi-  
cult shapes. Envelope dies that have cut over 50,  
000,000 envelopes, and another, that deposit  
sawth not how many, and some old oil well  
tools that have drilled two wells 2000 feet to-  
ward China, and good for another. The plant  
of these works consists of 9 steam hammers,  
one 12 inch and one 6 inch bar train with steel  
roughing rolls; one 12 inch cold rolling train,  
entirely of steel hardened and tempered; one  
16 inch sheet train, 4 Siemens' melting and two  
heating furnaces, 3 ordinary converting fur-  
naces, and one Swindell's gas fuel converting  
furnace—the first application of gas for con-  
verting grinding machines, shears, punches,  
&c., &c. The capacity of the works is over 24  
tons finished steel per day. This firm have  
made a specialty of the finest steel, such as  
would come in competition with Stubbs' and  
Hobson's choice, and have been very success-  
ful. For cold nail knives, especially, we have  
heard the highest praise given it. The strongest  
fight our manufacturers have had with foreign  
manufacturers has been over axe steel. In a  
little pamphlet giving a description of their  
exhibit, these works publish a letter from Wm.  
Mann, Jr., & Co., under date of April 25, 1876,  
in which they say they have used Chrome steel  
almost exclusively for seven years, and state  
that they consider it equal to any American or  
foreign steel they ever used, which means for  
40 years.

THE CHROME STEEL CO.,

of Brooklyn, N. Y., exhibit specimens of their

material and product, from the crude ore to the

finished bar, including chrome ore, ferro-

chrome, metallic chrome, Chrome steel in-

gots and finished steel of all grades, from the

homogeneous gun steel, which will not take

temper, up to the adamantine or hardest and

highest grade they make, from which tools can

be made for turning iron, etc., without hard-

ening. "Chrome steel" is not, as many sup-  
pose, a brand of carbon steel, of which the  
word "Chrome" is a trade-mark, but it is a  
separate and distinct metal, produced by an  
alloy of chromium with iron, and to this alloy  
the quality of the steel is due. The grade of  
steel produced is regulated by the proportions  
of chrome and iron used, which proportions are  
accurately determined by weight, and as a con-  
sequence are scrupulously exact, reproducing it  
is claimed, any given grade to an unlimited ex-  
tent with certain uniformity. Chrome being a  
metal, incorporates itself thoroughly in alloy  
with iron, and becomes integral in its unity  
with it; it will not volatilize under heat, and be-  
ing non-oxidizable, steel made with it is entirely  
exempt from deterioration by the application  
of long continued heat, and no process other  
than a chemical analysis will distinguish the  
two metals. Among the peculiar and valuable  
properties which are claimed for Chrome steel  
is the readiness with which it will weld to itself  
or to iron, either under the hammer or in the  
rolls. Several specimens of welded Chrome  
steel and iron are on exhibition, such as safe  
plates, which consist of alternate layers of steel  
and iron welded together, used in the construc-  
tion of burglar proof safes and vaults. These  
plates after being fitted to the safe, and are  
then hardened sufficiently to resist the action of  
the hardest drill, the iron retaining ductile,  
and resisting fracture under heavy blows. Also  
compound steel and iron bars, which it is as-  
serted cannot be sawed or broken by blows.  
These bars are designed for the construction of  
gratings for jails and prisons, and for burglar  
proof protectors for bank buildings and other in-  
stitutions. There are also several fine specimens  
of sections of compound steel and iron beams  
and girders, the steel being inserted either in the  
top, bottom, web, or in each if desired when  
the pile is made up for rolling. By this combi-  
nation of welded chrome steel and iron a large  
increase of strength is effected, as also great  
saving in the weight of material. There is also  
a large assortment of different grades of tool  
steel of various sizes. Perhaps the most inter-  
esting to a practical mechanic are the samples  
of square bars of high grade tool steel  
twisted cold. The regularity of the twist shows  
the uniformity and toughness of the material,  
and the fine fracture of the tempered ends is  
clear evidence of its hardness. Not the least in-  
teresting feature of the exhibit is the notice  
which surrounds the exhibit. On it the com-  
pany write their challenge to the world to meet  
it in competitive tests. Such a trial at the  
Centennial Exhibition would be watched with  
great interest, particularly by the consumers of  
tool steel of all kinds.

THE CO-OPERATIVE STEEL AND IRON CO.,

Danville, Pa., make a small display of puddle

steel rails at T. 63, Main Building. Some of

these are broken, showing quite good fracture,

but in the absence of anyone in charge of the

exhibit, we could learn nothing as to their

value compared to either Bessemer, Martin or

iron rails.

THE STANDARD STEEL WORKS,

(of Lewistown, Pa.), exhibit at E. 73, Machinery

Hall, consists of crucible steel locomotive and

car wheel tires in various stages of manufac-  
ture, from the hammered ingot to the finished  
tire, with some samples of steel railroad frogs.  
The tire ingots are thoroughly hammered and  
worked before being rolled to exact diameters,  
which is done by a combination of rolls, one  
being a pressure roll and the others formers.  
More than 10,000 of the tires made by this com-  
pany are in use on the railroads of the United  
States, and are on the locomotives exhibited by  
Baldwin, Dickson, Danforth, Porter, Bell & Co.,  
and on part of those used on the narrow gauge  
railroad on the Centennial grounds.

THE ADIRONDAC STEEL WORKS,

Gregory &amp; Co., Jersey City, exhibit at T. 59,

steel ingots and various kinds of crucible steel,  
such as tool, hammer, spring, machinery, frog,  
lathe spindle, crank pin, &c. This firm have on  
a sign the words "Established 1848." This  
makes it one of the oldest in the country.



## Iron.

CLEVELAND.

## Cleveland, Brown &amp; Co.

IMPORTERS, MANUFACTURERS AND DEALERS IN

## IRON AND STEEL,

HORSE SHOES, HORSE NAILS,

NORWAY NAIL RODS,

NAILS, SPIKES,

"Standard Taper" Axles &amp; Swedes Iron.

WINDOW GLASS,

Wrought Iron Pipe and Boiler Tubes.

Canals, Rivets, Nuts, Washers, and Heavy Hardware Generally.

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Exclusively for the Analysis of Ores of Iron, Pig and Manufactured Iron, Steels, Limestone, Clays, Slags & Coal for Practical Metallurgical Purposes.

No. 339 Walnut Street, Philadelphia.  
J. BLODGET BRITTON.

This Laboratory was established in 1866, at the instance of a number of practical iron-masters, expressly to afford prompt and reliable information upon the chemical composition of the substances above mentioned, for smelting and refining purposes. The object being to make it at once a convenient, practically useful, and comparatively inexpensive adjunct to the Furnace, Forge and Rolling Mill.

## CHARGES TO IRON WORKS.

For determining the per cent. of Pure Iron in an ordinary Ore..... \$4 00  
For the per cent. of Pure Iron, Sulphur and Phosphorus in do..... 12 50  
For each additional constituent of usual occurrence..... 1 50  
For those of unusual occurrence or difficult to determine, the charge must necessarily depend upon circumstances.  
For determining the per cent. of Sulphur and Phosphorus in Iron or Steel..... 14 00  
For each additional constituent of usual occurrence..... 6 00  
For the per cent. of Carbonate of Lime, and Insoluble Silicious Matter in a Limestone..... 10 00  
For each additional constituent..... 2 00  
For the per cent. of Water, Volatile Combustible Matter, fixed Carbon, and Ash in Coal..... 12 50  
or determining the constituents of a Clay, Slag, Coke, or of an Ash of Coal the charges will correspond with those for the constituents of an ore.  
For a written opinion or letter of instruction the charge must necessarily depend upon circumstances.  
Printed instructions for obtaining proper average samples for analysis furnished upon application.

## WALLACE &amp; HUMPHREY,

## Analytical Chemists,

113 Walnut St., PHILADELPHIA.  
Special attention given to analysis of Iron and Steel.

## GEORGE W. BRUCE,

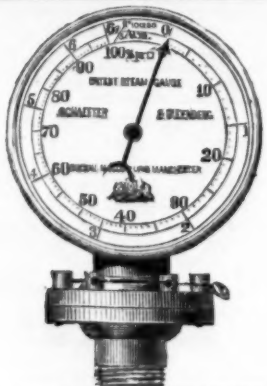
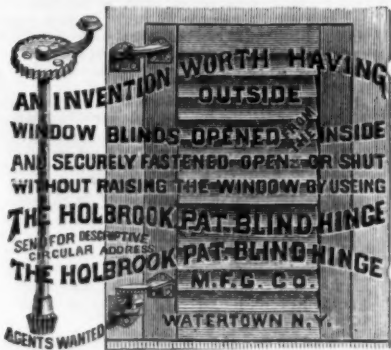
No. 1 Platt Street, New York.

Offers a full assortment of Nettlefold's superior Screw Eyes, Hooks, &c., also many sizes of their Screws, which can be supplied very advantageously for foreign orders, though our duty equals the present American price.

## BORAX.

We beg to offer to the trade our own well known brand of strictly pure crystallized Borax, in barrels and cases, at greatly reduced prices. Apply for terms at

CHAS. PFIZER & CO.,  
Manufacturing Chemists, New York.



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MAGDEBURG, GERMANY.  
Steam, Blast, Vacuum and Hydraulic Gauges, Engine Counters, Pyrometers, Buss Patent Governor, Steam Reducing Valves, etc. Sole Depot,  
W. HEUERMANN, NEW YORK.

## Iron.

## THE MILWAUKEE IRON CO.

Manufactures and Offers For Sale

## MERCHANT BAR IRON.

Flat Bars up to 6x2. Rounds and Squares up to 4 inch, Ovals, Half Ovals, Half Rounds, Box Iron Cylinder Bars, Plow Beam Iron, &c. Also, Hoop, Band, Horse Shoe and Shafting Iron of superior quality. A full assortment in store after February 1st.

## PIG IRON.

Superior No. 1 Foundry Iron constantly on hand. Bessemer Iron and Special Grades of Foundry Iron made on orders.

## RAILROAD IRON.

Thirty Patterns, from 30 to 65 lbs. per yard. Re-rolling done on short notice.

## RAILROAD SPLICES.

Fish Plates to fit all rails used in the West. Track Bolts made from Iron of superior quality. A large stock on hand. New patterns made promptly.

## CAR LINKS AND PINS.

All patterns kept in store or made to order. Link and Pin Iron in stock.

## CAPACITY OF WORKS FOR 1876.

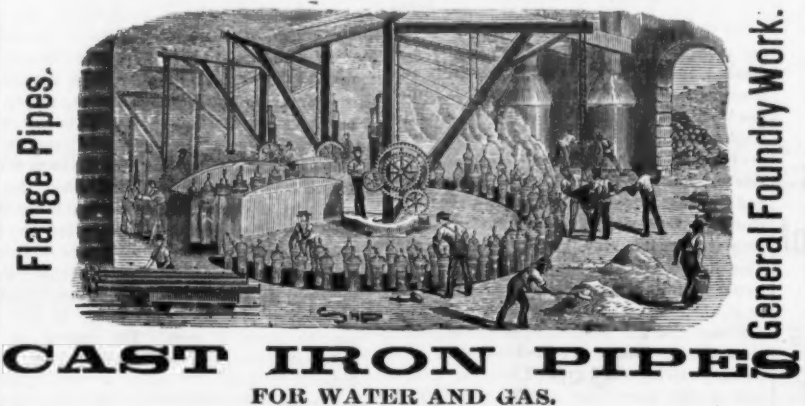
|                                |              |
|--------------------------------|--------------|
| Merchant Bar Iron              | 20,000 tons. |
| Pig Iron                       | 35,000 "     |
| Railroad Iron                  | 40,000 "     |
| Railroad Splices and Couplings | 5,000 "      |

Address all correspondence to

MILWAUKEE IRON CO., Milwaukee, Wis.

## McNEALS &amp; ARCHER,

BURLINGTON, N. J.



## JOHN H. REED &amp; CO.,

## IRON MERCHANTS,

And Agents for BAY STATE IRON CO.,

Manufacturers of and Dealers in

Homogeneous Boiler & Fire Box Plates, Plate, Sheet, Pig & Railroad Iron. Wrought Iron Girder, Channel & Deck Beams.

ANGLE and T IRON, BOILER and TANK RIVETS, Lap-Welded Iron Boiler Tubes, Wrought Iron Steam and Gas Pipe.

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ESTABLISHED IN 1840.

SAMUEL J. CRESWELL, Jr.,

OFFICE: 812 Race St. WORKS: Twenty-Third &amp; Cherry Sts., PHILADELPHIA.

Iron Fronts, Stair Girders, Lintels, Columns, etc

## The American Ice Chisel



THE HARDWARE TRADE are hereby cautioned against an imitation of our American Ice Chisel, made of Malleable Iron Castings, which has made its appearance in the market. It is mickel plated and calculated to deceive. Our chisels are made of the best cast steel and warranted.

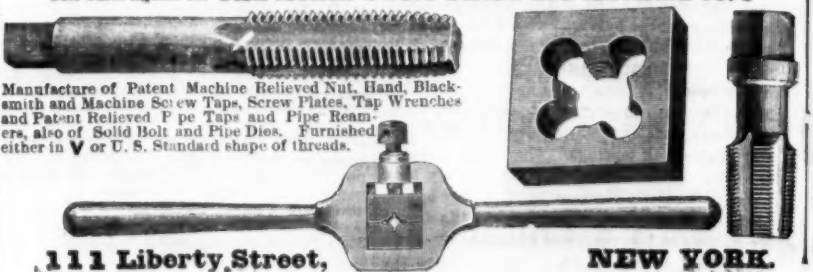
EDWARD J. HOLDEN &amp; CO.,

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## H. S. MANNING &amp; CO.,

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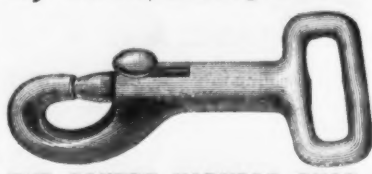
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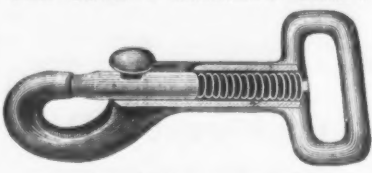
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## New Patents.

We take the following abstract of new  
patents, recently issued, from the official rec-  
ord:

178,453.—*Fluting Iron*.—W. I. McCausland,  
Dallas, Texas.—June 6.178,465.—*Valve for Direct Acting Engines*.—Ed-  
ward Purvis, New York, N. Y.—June 6.178,502.—*Saw Mandrel*.—Jas. T. Bagge, Bridge-  
port, Ohio.—June 13.

The saw can be held to run in a plane perpen-  
dicular with the mandrel, or readily changed to  
different angles therewith, by means of two ad-  
justable collars, the inner collar being provided  
with a pin extending through a slot in the saw  
into a corresponding slot in the outer collar, and  
a graduated plate loosely attached to the  
outer end of the arbor, and adjustable, as de-  
sired, by set screws passing through it, and  
pressing against shoulders formed on the outer  
collar.

178,513.—*Water Chill for Puddling Furnace*  
*Throats*.—Thomas Davis and William Roberts,  
Sharon, Pa.—June 13.178,604.—*Packing for Balanced Piston Valves*.—  
David Dale, Millerstown, Pa.—June 13.178,648.—*Valve for Steam Pumps*.—W. H.  
Laurie, Montreal, Canada.—June 13.178,711.—*Hydraulic Elevator*.—Henry E. Bath-  
rick, Somerville, Mass.—June 13.178,822.—*Chill*.—Charles A. Wilson, Cincinnati,  
Ohio.—June 13.

Chill may be hinged on one side and dowelled  
on the other. Hardens external surface of  
pipe, but leaves inside of ends soft for thread-  
ing or screw cutting.

SOLDERING IRON.

To Wm. H. Clark and Wm. J. Clark, Salem,  
Ohio.—June 20.—Dovetail projections on the  
jaws clasp recesses on the soldering iron.

In tinners' soldering irons, the jointed sec-



tions A, B, provided with one or more wedge  
shaped or dovetailed jaws, D, E, in combination  
with the copper G, having therein gains F, F',  
corresponding with said jaws.

BUCKET EAR.—REISSUED.

To John G. Kirchbaum, Youngstown, assignor  
to Barrett, Waters & Lewis, Cincinnati, Ohio.—  
Patent No. 89,666, dated May 4, 1869.—June  
20.

1. A ball ear consisting of a single strip of  
material, the ends of which are bent at an angle



to the body of the ear to form two prongs, lo-  
cated one above the other, and the upper por-  
tion of the ear formed into a loop for the at-  
tachment of the ball.

2. A ball ear constructed with two prongs,  
located one above the other, and a loop, and  
formed of a single piece of material.

178,832.—*Combined Saw File and Set*.—Eben M.  
Boynton, Newburyport, Mass.—June 20.178,833.—*Wrench*.—Walter Britton Elmore, Ill.  
—June 20.178,838.—*Machine for Rolling Axles*.—Gilbert K.  
Dearborn, Somerville, Mass.—June 20.

The axle is inserted endwise between the  
rolls, which are closed down upon it to impart  
the desired shape and size.

178,855.—*Charcoal Kiln*.—Bart Kane, Cincin-  
nati, Ohio.—June 20.178,870.—*Reversible Valve for Steam Engines*.—  
Frank Murgatroyd, Cleveland, Ohio.—June  
20.178,872.—*Saw Filing Machine*.—William S. New-  
ton, Norwich, Conn.—June 20.

A sliding gage arm is attached to the under  
side of the frame, parallel with the rotary  
file journal, to regulate the depth of the  
cut. The saw is fed by the usual switch  
shifter.

178,873.—*Nail Plate Reeder*.—J. Newell, Detroit,  
Mich.—June 20.

The invention comprises a magazine for re-  
ceiving a pile of plates; a device for forcing  
the lowermost plate from the pile, dropping it  
upon the floor of the magazine; a feeding rod,  
operated by a screw shaft, for pushing the plate  
forward; an intermittently revolving sheath  
or plate holder, for receiving the plate and  
presenting it to the cutters (caused to rotate as  
the cross-head to which it is attached reciproc-  
ates) by the lugs upon its periphery entering  
spiral slots cut in a series of stationary disks;

a mechanism for closing the said spiral slots,  
causing the lugs upon the sheath to travel  
backward in a straight slot, and allow the sheath  
to remain at rest when a new plate is to be in-  
serted; and a mechanism for connecting and  
disconnecting (at the proper intervals of time)  
the pitman of the machine with the sheath re-  
ciprocating devices.

178,874.—*Curry Comb*.—Gervais Nolin, West  
Waterville, Me.—June 20.

The clearing plates are provided with elon-  
gated slots, which allows them, by a quick  
lateral shake, to be shifted from one side to the  
other, thus clearing both sides of the double  
faced comb.

178,877.—*Flow*.—S. W. Pope, Louisville, Ky.—  
June 20.178,880.—*Flow*.—Francis R. Bell, Marshall,  
Tex.—June 20.

A wood mold board with a metal back, hav-  
ing within a recess to contain oil, and numer-  
ous perforations, to allow the oil to circulate  
through the wood and lubricate the wearing  
surface.

178,933.—*Thumb Latch*.—C. S. Jennings, New  
Haven, Conn.—June 20.178,940.—*Combined Time and Combination Lock*.—  
Franklin McDuffee, Rochester, N. H.—  
June 20.179,073.—*Soul Lock*.—Thomas A. Stack and Jos.  
G. Fisher, Toledo, Ohio.—June 20.178,998.—*Process for Extracting Zinc from its*  
*Ores*.—Frank L. Clerc, Bethlehem, Pa.—  
June 20.

The zinc vapors and furnace gases pass from  
the body of the furnace, beneath the arch of  
the surrounding dome, into the annular jacket  
chamber, wherein the zinc condenses, and from  
which it is tapped. The gases continue to a  
washer and collector. By reason of the con-  
struction of the feeding shaft and the manner  
of charging, a layer of carbonaceous fuel is al-  
ways maintained by its natural talus above the  
body of the charge, whereby the escaping zinc  
vapors and carbonic acid gas are thoroughly  
deoxidized just prior to their entry into the  
jacket chamber.

179,034.—*Projectile*.—James M. Pollard, New  
Orleans, La.—June 20.179,068.—*Machine for Turning Handles*.—  
Thomas Seely and John N. Chilcote, Edger-  
ton, Ohio.—June 20.

A series of lathes are arranged within a re-  
volving frame, each one carrying its own cut-  
ters, the lathes mandrels being rotated by a  
single belt, which passes around their pulleys.

179,072.—*Metallogie Furnaces*.—Wm. Silvester  
and Henry Kirk, Pittsburgh, Pa.—June 20.178,865.—*Can Jacket*.—J. G. Low, Chelsea,  
Mass.—June 20.

Metal bound edges for jacket; abutting edges  
united by soldering the bindings, or riveting an  
inside or an outside plate to the edges of the  
jacket.

178,903.—*Well and Cistern Top*.—John M. Bull,  
Sidney, Ohio.—June 20.

A platform for wells or cisterns, which is  
made of iron, wood or other material. The  
platform is provided with a door which is  
hinged, and may be raised and lowered by a  
handle. By opening the door light is thrown  
into the well, to admit the taking out of the  
pump for repairs.

178,917.—*Stove Platform*.—J. W. Elliot, Toron-  
to, Canada.—June 20.178,938.—*Tea and Coffee-pot*.—Edward B. Man-  
ning, New Haven, Conn.—June 20.

The body is encircled at top and bottom with  
hoops or bands with vertical connections, to  
which are attached handle and spout. A  
packed connection is made between the body  
and spout.

178,944.—*Damper Regulator for Furnaces and*  
*Stoves*.—Alvin C. Norcross, Boston, Mass.—  
June 20.178,977.—*Device for Heating Air for Furnaces*.—  
Charles Thonger, Courtright, Canada.—June  
20.178,972.—*Liquid Filter*.—Robert Stewart, Brook-  
lyn, N. Y.—June 20.

The flexible diaphragm carries the valve  
mechanism, which regulates the flow of the  
liquid according to the pressure. The double  
diaphragm below serves to pack the filtering  
material, and its action depends upon the upper  
one, varying as the pressure.

178,996.—*Sheet Metal Can*.—George H. Chin-  
nock, Brooklyn, N. Y.—June 20.

Places the wire in a cut or swaged thin por-  
tion of the rim or top of the cover.

178,997.—*Funnel Tong*.—Geo. B. Clarke, Leon-  
ardville, N. Y.—June 20.

A device for holding funnels while pouring  
into a jug or other receptacle; and, also,  
in combining with such a funnel a heating  
iron, for the purpose of making viscid subst-  
ances pass through the funnel quickly in cold  
weather.

179,003.—*Valve for Basins*.—John Doyle, Hobo-  
ken, N. J., and Stephen Bayles, New York,  
N. Y.—June 20.

The discharge valve is operated by a handle  
that connects from the slab at the side  
of the basin down to the valve at the cen-  
ter of the basin, where the plug is usually em-  
ployed.

179,024.—*Pipe Cutter*.—George P. Jacobs and  
Jacob Jamer, Brooklyn, N. Y.—June 20.

The square holder is allotted at one of its  
corners to permit the cutter to pass through;  
is removable by withdrawing the cutter from  
this slot; is hinged in two portions, and, when  
removed from its socket, unclamped by a  
thumb-screw, to admit of different sized pipe  
rests. The slot in the square rest, through  
which the cutter passes, serves both as a guide  
and to prevent the cutter from turning as its  
handle is revolved. The square holder may be  
replaced by screw threading dies. The cutter  
is brought to the pipe by a feeding unit in a  
hollow screw threaded handle, which revolves  
simultaneously with a rotating sleeve.

179,076.—*Time Lock*.—Thos. W. Spencer, Cir-  
cleville, Ohio.—June 20.179,086.—*Underground Tube for Propulsion of*  
*Cars*.—Andw. S. Hallidie, San Francisco,  
Cal.—June 20.

A series of openings are formed at intervals  
along the tube, so that the grappling de-  
vice may be withdrawn from the tube when  
desired.

7184.—*Rotary Steam Boiler*.—Reissued.—Charles  
W. Pierce, New York, assignor to the Pierce  
Rotary Tubular Boiler Company, same  
place. Patent No. 166,807, dated Aug. 17,  
1875; reissue No. 6750, dated Nov. 16, 1875.—  
June 20.

Water buckets encircle each of the outer  
series of tubes, by which water is carried up and  
over the water level in the boiler.

An ingenious mechanic in St. Louis has in-  
vented what he calls a "steam hand car" for  
the use of railway laborers, which, according  
to the *St. Louis Republican*, is propelled by a  
"stationary engine" on the car. A "steam  
hand-car" is a curiosity, but how the inventor  
expects to move it at the rate of 25 miles an  
hour by means of a "stationary engine," unless  
he projects it like a shot out of the 81 ton gun,  
we fail to comprehend. The confusion of  
terms, for which the *Republican* is doubtless re-  
sponsible, is only equalled by that of the Dutch-  
man, who wanted an empty barrel of flour to  
make his dog a hen coop.



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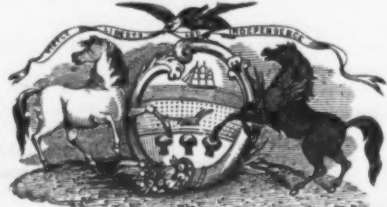
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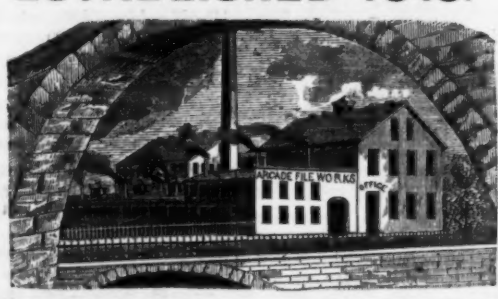
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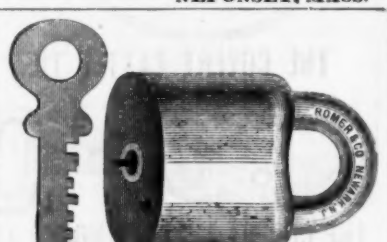
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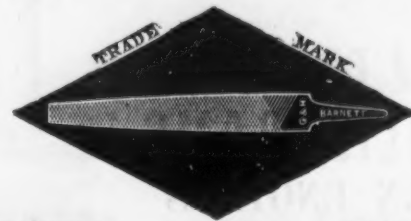


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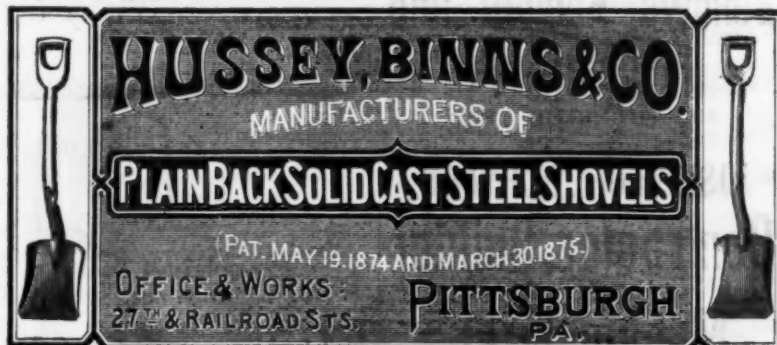
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**FILES and RASPS.**



**All Goods Warranted.**





## A. FIELD & SONS,

TAUNTON, MASS., Manufacturers of  
COPPER & IRON TACKS, TINNED TACKS,

SUPERIOR SWEDS IRON TACKS, for Upholsterers' Use, Saddlers' Supply, Card Clothing, etc., etc.

**American and Swedes Iron Shoe Nails,**

Zinc and Steel Shoe Nails, Carpet, Brush and Gimp Tacks, Common and Patent Brads, Finishing Nails, Annealed Trunk and Clout Nails, Hob and Hungarian Nails, Copper and Iron Boat Nails, Patent Copper Plated Tacks and Nails.

Fine Two Penny & Three Penny Nails, Channel, Cigar Box & Chair Nails, Leathered Carpet Tacks, Glaziers' Points, Etc.

OFFICES AND FACTORIES AT TAUNTON, MASS. WAREHOUSE AT 78 CHAMBERS STREET, N. Y., where may be found a full assortment of Tacks, Brads, &c., for the accommodation of the New York Wholesale and Jobbing Trade.

Any variations from the regular size or shape of the above named goods made from samples, to order.

**Hoisting**

Machinery  
Manufactured by  
Crane Bros. Mfg. Co.,  
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COOKE & BEGGS, Agents, 16 Cortlandt Street, New York.



**Tempered Steel Spiral Springs,**

Of all sizes and descriptions, made to order by  
**JOHN CHATILLON & SONS, 91 & 93 Cliff St. N. Y.**  
Our Springs are used by the U. S. Government, and various Meteorological and other Scientific Institutions.

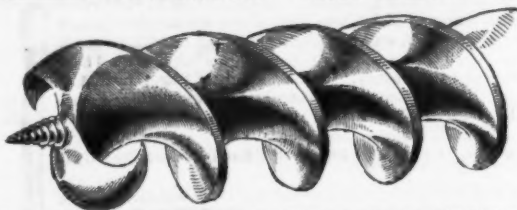
## THE DOUGLASS MFG. CO.,

New York Warehouse, 62 Reade Street. P. O. Box 2610.

FACTORIES, Seymour, Conn.

MANUFACTURERS OF

### COOKS' BORING IMPLEMENTS.



These goods have been in use over twenty years. We have reduced our List Price of Cook's Augers and Bits. Discounts remain unchanged.



Chisels, Gouges and Drawing Knives of all kinds, Screw Drivers, Screw Driver Bits, Cook's and Douglass Mfg. Co.'s Augers & Bits, Wood and Metal Head Gimlets, Improved Hollow Augers, Blake's Patent Extension Bits, Boring Machines, Chisel Handles, Wood Boxes, Tool Chests.

Our New Catalogue, issued July 1st, will be furnished upon application.



### THE HURRICANE FORGE. (PATTERSON'S PATENT.)

Also Stationary Forges.

Large Size, superior to stone or brick. Can be used with bellows or fan. Send for prices and further information to  
**GEORGE PLACE, General Agent,**  
121 Chambers & 103 Reade Sts., N. Y.



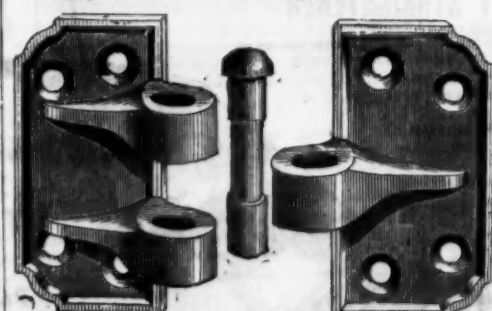
## CLARK & CO., MANUFACTURERS OF BUILDERS' HARDWARE. BUFFALO, N. Y.



Design Patented Jan. 11th, 1876.

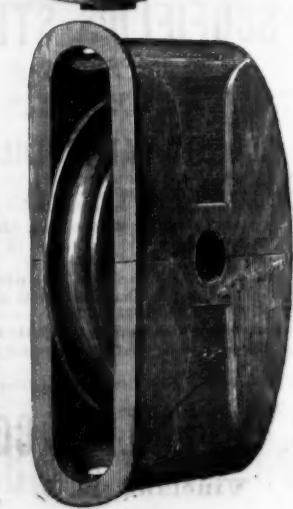


NEW PATENT, No. 1 Hinge.



No. 1 Upper Gate Hinge.

Send for Illustrated Catalogue and Price List.



### BUSINESS ITEMS.

#### CONNECTICUT.

The Winchester Arms Company are working nights now, and have 1000 hands employed. They will be kept at work until the contract with the Turkish government is completed.

#### PENNSYLVANIA.

The Pennsylvania Transportation Company, who propose to lay a pipe line to the seaboard for the transportation of oil, have made a contract for 300 miles of pipe to be used in its construction.

The two Paxton Furnaces, Harrisburg, have been idle, one for 18 months and the other for 12 months. The former starts at once, and the other as soon as it can be got ready—perhaps a month or two.

The Lochiel Mill, Harrisburg, broke a portion of its mill machinery last week, and will be idle for a week or so.

The new hoop mill of Messrs. Kimberley, Carnes & Co. was blown in on Tuesday, and in a few days will be in full operation, as is the balance of their establishment.—*Sharon Herald.*

The Shenango Furnace No. 2 was blown in on Monday week.

The new blowing engine built for Mount Hope Furnace, at the Weimer Machine Works, Lebanon, has been thoroughly tested at the works the past few days, and has given the most perfect satisfaction. It is similar to the one placed on exhibition at the Centennial by Mr. Weimer, and which has attracted much attention. We learn that inquiries are made from different parts of the country about the engine—the cost, capacity, &c., and the prospects now are that Mr. Weimer will soon have a substantial appreciation of his genius in this direction by numerous orders.

Grabbs' St. Charles, of Columbia, and Chickies No. 2 furnaces, out lately, are now undergoing necessary repairs, and will start up again in a few weeks.

#### PITTSBURGH AND VICINITY.

The Luey Furnace blew out on Thursday last for repairs—refractory. Work on the new stack is suspended for the present.

Five miles above Kittanning, Armstrong county, at the mouth of Pine Creek, the Midland Oil and Mining Company are boring an oil well to the depth of 1008 feet. They have struck a vein of gas sufficient to fill a four inch gas pipe; the blaze of the gas burned extends some 20 or 30 feet, and it is thought that it will furnish an abundant supply of fuel for the Kittanning Rolling Mill, which is now owned by Meredith, Yetzel & Co. This mill has been idle about two years. If the gas will yield as well as expected—and there is every reason to believe it will—the managers of the rolling mill will, it is said, start up in a short time, giving employment to nearly 300 men.

Messrs. Jones & Laughlins are shipping some 15 cars of cotton ties per day.

The iron works of Lloyd & Black, on Second avenue, have shut down, and extensive repairs are now being made to the machinery and furnaces.

The glass manufacturers have taken in hand, it is said, the subject of freight discrimination, and at a recent meeting a committee was appointed to visit the railroad authorities and ask relief. The result of the interview, if yet held, has not been announced.

Lewis, Dalzell & Co.'s new pan mill, in Sharpsburg, is doing the most thriving business of the place, and it will do a more thriving one when the boys engaged in it have learned their work. More than 5000 pans a day are made there now, and made entirely by machinery. One machine cuts the plate, another presses it into shape, and a third fastens on the wire rim. The pans are bread or dripping pans, and without a seam. The demand for them is so great that last week the firm had to buy sheet iron, their own sheet mill not being able to make enough.

A gentleman named Call, who has a patented process for making gas out of the refuse at coal mines, is putting up a furnace in Sharpsburg to make gas for use as fuel in Lewis, Dalzell & Co.'s mill. He claims that in the small furnace now going up he can produce gas enough to supply the entire mill. The expense of making it he expects to be light, and in consequence expects to effect a great saving in labor and money by doing away with the use of coal. The firm owning the mill furnish the means necessary to test the process, and if it prove all right the firm are to be entitled to a free use of it. The patentee is sanguine of success, as he has tested his invention in glass works.

#### OHIO.

The Standard Oil Company, Cleveland, have just given an order for 4000 tons of barrel hoops.

The Sheridan coke ovens seeming to answer all expectations, the erection of a furnace near those coal works is spoken of.

The Ironton Register says: An experienced furnaceman informs us that it costs the price of just enough coal to make a ton of iron for a furnace to stop on Sunday—that is about \$9.

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The furnace of the Iron and Steel Company, Ironton, which was at last report being shoveled out, is again in blast. We trust it got well off this time.

Belfont mill and furnace will go to work about the 1st of September.

The Burgess Steel Works, of Portsmouth, after a week's suspension, resumed on Monday.

The Cleveland Axle Manufacturing Company are running their works on a fair average production, and have a good trade. They make a homogeneous steel carriage and wagon axle a specialty.

#### KENTUCKY.

A part of the housing of the old Union Mill, the first built in Pittsburgh, are in use at the mill of Mitchell, Tranter & Co., Covington.

The Ashland Furnace blew in last week.

#### MICHIGAN.

According to the Marquette Mining Journal, the shipments of ore for the season up to the 2d inst. are as follows:

|                            |           |
|----------------------------|-----------|
| From Marquette.....        | 936,879   |
| From L'Anse.....           | 37,945    |
| From Escanaba.....         | 178,411   |
| Total.....                 | 1,153,235 |
| Same period last year..... | 396,063   |

Increase this year..... 44,873

The Republic is shipping from 800 to 1000 tons a day.

The Barnum is shipping 50 cars of ore per day.

The Salisbury will probably ship 20,000 tons this season.

The Spurr Iron Mine is working 80 men, and producing about 50 tons per day.

The Lake Superior Mine has shipped, up to the 28th of June, 1876, 1,175,000 tons, the largest output of any mine in the region.

The Nagsawee (L. S.) Herald says: "The McComber Mine has increased its force somewhat, and proposes to ship 30 cars of ore per day, from now until the close of navigation. The Morgan Furnace is in full blast, and the Menominee will go into blast in a few days. At the Michigan Mine four shafts are now ready for working, and the new machinery has capacity for raising 1000 tons of ore per day. This is, we think, the most powerful machinery in the iron district. Forty cars of ore per day are being shipped from the Winthrop Mine, and it is probable that the amount will be kept up through the season. Pretty good for one of the small mines."

The largest cargo of ore ever carried from this port was taken out last week by the schooner Hazard; 1530 gross tons, or nearly 1800 net tons, is what she managed to get away with.—*Escanaba Tribune.*

#### MISSOURI.

The Ironside Furnace is being repaired and put in most excellent condition. The engine cylinder was damaged so greatly that a new one has been put in. It is intended to be ready to go back into blast about the 1st of September.

The Hamilton Furnace, one of the few Missouri charcoal furnaces that ran through the winter, on account of continued high water cutting off the ore supply, has been driven out of blast.

#### The Statue of Liberty for New York Harbor.

A fragment of the great statue of Liberty, destined for Bedloe's Island, was put ashore at pier 37, North River, on Monday, from the French steamer Labrador. It was contained in a huge case, as large as a small dwelling, made of boards nailed rudely together, with open spaces between. All of the statue it held was the wrist and right hand, with a section of the torch which the right arm is to hold aloft, bearing a flame, which will serve as a light-house beacon. The vast case rested on a truck and was an object of much curiosity to the people around the docks. The French sailors, of the Labrador, fairly danced around it in their enthusiasm, calling on those in the vicinity, whom they guessed were Americans to come and "see tumb."

The thumb, which partly encircled the torch (a huge cylinder of twelve feet in circumference) was a ludicrously gigantic member. On the thumb nail alone a man of several hundred pounds avoirdupois might find a more roomy seat than in a Third Avenue car. As for the arm below the elbow and opening into the palm of the hand three men of ordinary stature might walk abreast within its interior. It is said that inside the upper and broader part of the arm above the elbow as many as nine men can be comfortably accommodated. This fragmentary part is made of bronzed copper, about a sixteenth of an inch in thickness. It is in line, evenly rolled plates, riveted and screwed together in the firmest and most elaborate manner. The completed statue will be about 120 feet in height, from the crown of the head to the sole of the foot, the elevation of the pedestal being, perhaps, a third of the altitude of the statue. It is understood that a staircase will be placed within the right arm, by which ascent can be made to a balcony running around the edge of the flambeau. The height of the complete arm is 35 feet. Of course, the statue is upright. The left arm is bent so as to enfold and hold lightly toward the body a set of tablets upon which the Declaration of Independence is supposed to be inscribed. A tunic falls over a peplos from the shoulders to the feet. The head is surrounded by a diadem, from which projects a circlet of prongs that catch the sun's rays and construct a brilliant nimbus of glory out of them. The folds of the outer garment are so arranged that the edges fold diagonally across the figure. Its estimated cost is \$125,000, half of which has already been subscribed.

Both pedestal and statue will be completed in two years from now, and it will be the joint enterprise of France and America. Along with the fragment already received and the portion on exhibition at Philadelphia the right arm is supposed to be complete.

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Rochester, N. Y.

Wrought Iron Riveted  
Lattice Railroad

AND  
HIGHWAY BRIDGES.

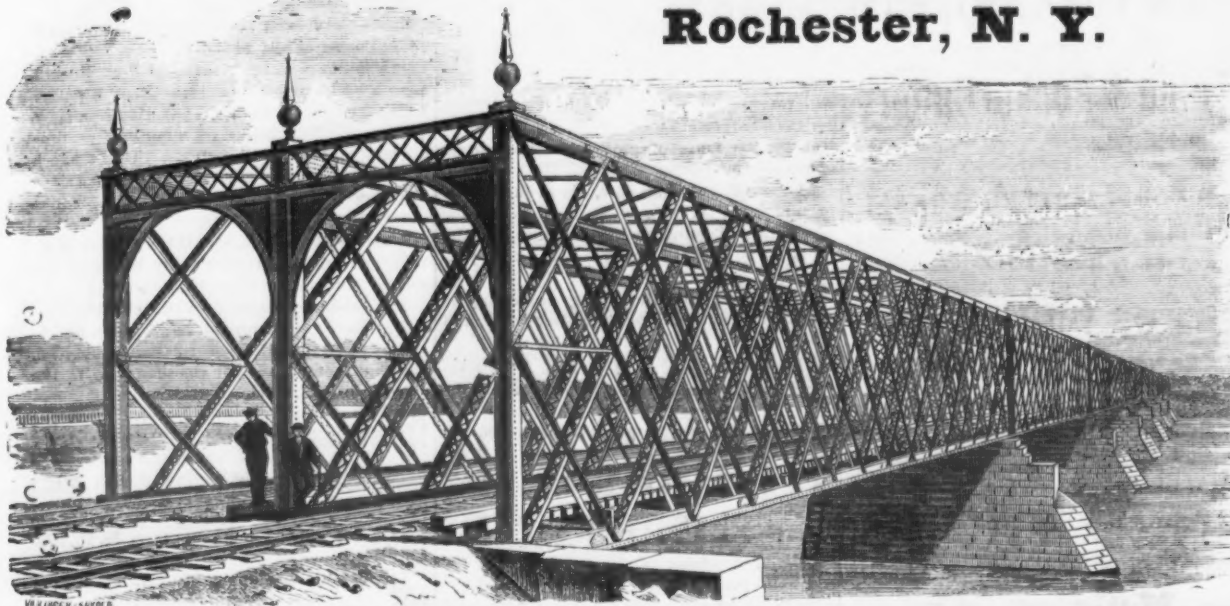
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General Riveted Work

Orders Solicited from Civil Engineers  
and Contractors.

[Accompanying engraving represents the Spring-  
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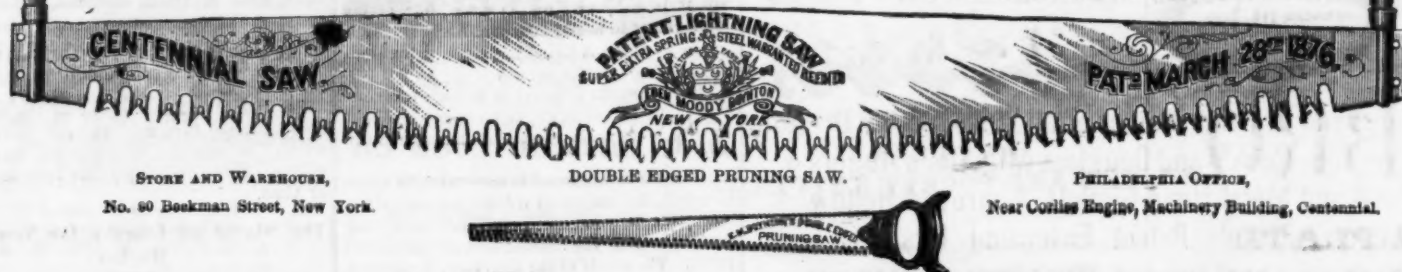
## SPRINGS & AXLES

And Beer's Patent Curtain Rollers, Concealed Hinges, Etc., Springs of any pattern made to order. Send for Circular and Price List.

Any Dealer is aware that in an ordinary Hand Saw, the front cut is the effective cut, and drawing back; the saw has little effect by reason of the slant edges riding over the fibre, as the Saw is drawn back. The difference between the front cut of a Hand Saw, and the back cut, is the difference between the Lightning Saw teeth and all others; for all other saws are set one point and ride on slant edges. By setting two points of my M the same side and the next two the other, I conceal the slant between them, and operate wholly by the outside of a nearly vertical M tooth. Standing nearly vertical the two points of the M occupy the same space as the old V tooth. One point only is cutting and the other follows in the slit behind it to cut in the same manner, in the return motion, thus doubling the cut upon the same base and space of tooth. This construction also gives the breadth and durability of nearly an inch of steel instead of a single slender scraping point, and presents the upright instead of the slant edges to the timber. Any one can in a moment test the principle by comparing the front and back cut of any V tooth Hand Saw. My new patent of March 28th, 1876, allows the saw-dust perfect clearance; the arch slightly widening to the points of teeth renders it impossible for green or resinous saw-dust to be retained, while the slightly increased breadth at base of tooth gives the durability so much advocated by parties who have round-edged files for sale. Slightly pyramidal, the outer edges are as upright as the front cut of a Hand Saw, and the back slant cut is concealed in no other Saw than mine, by setting the two points of M to cut in line instead of alternately. Thus by this new Patent I avoid all "overhang or under-cut," avoid all tearing, and to the matchless speed of the Lightning dress and set, add the durability, simplicity of sharpening, and sweet cutting so much admired. I thus adapt the Lightning teeth to universal use, in all Hand, Pruning, Buck, and Cross-Cut Saws. The concave in the centre of the M saves files, and renders it impossible to file the tooth out of shape. A 10-inch Cant File and Set fitting the M is furnished for forty cents, that will file ten saws easily.

A 16-inch log was sawed off in 17 seconds by hand with a Lightning Cross-Cut Saw, at Pennsylvania State Fair, on September 30th, 1874, before President Eby; W. B. Lawson, S. S. Hoagland, and other officers of the State Board, timing.

\$1000 challenge to any responsible saw manufacturer, to match the Lightning saws in speed of cutting and ease of sharpening. This patent saw tooth has recently been vindicated by U. S. Court decreeing costs and damages for infringements. Beware!



STORE AND WAREHOUSE,  
No. 60 Beekman Street, New York.

DOUBLE EDGED PRUNING SAW.

PHILADELPHIA OFFICE,  
Near Corlies Engine, Machinery Building, Centennial.

## THE HARTFORD FOUNDRY AND MACHINE CO.,

Successors to the  
WOODRUFF & BEACH IRON WORKS,  
Hartford, Conn.

J. S. HUNTER,  
President.  
E. J. MURPHY,  
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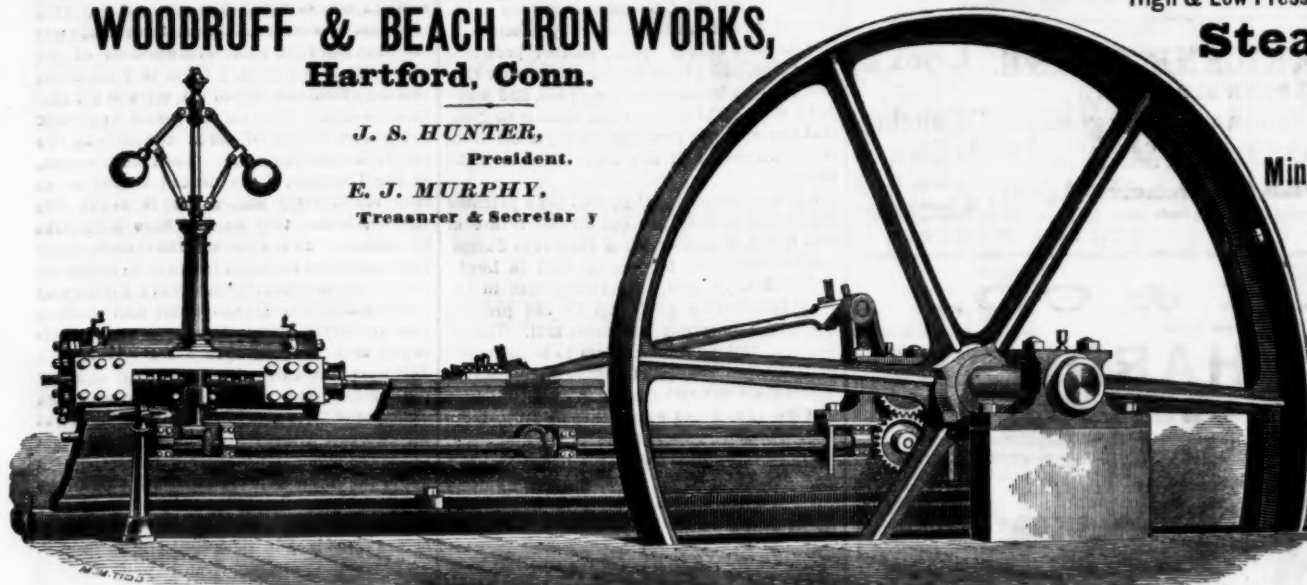
High & Low Pressure Marine & Stationary  
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AND  
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And every Variety of Iron and Com-  
position Castings made  
to order.

The following are a portion of the  
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and are a sufficient guarantee of our  
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Charlestown, Mass. and Norfolk, Va.  
Navy Yards, and the engines in the  
U. S. Steam Sloop of War Michigan,  
Kearsage, Manitoa, Minnetonka and  
Piscataqua and the Gun Boats Cayuga,  
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ment Transports Dudley Buck and  
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large Horizontal Engine for the new  
Plate Mill of the Bay State Iron Co.



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COHOES, N. Y.

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Manufacturers of **AXES** of all Kinds.

Hatchets, Adzes, Grub Hoes, Mattocks & Picks.

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PERKINS and RHODE ISLAND PATTERNS of

HORSE AND MULE SHOES.

## C. SCOFIELD'S STRAIGHTENER OR BENDER,

For Shafting, Axles, Tubes, Rails, &c.

There has long been a want of some device by which the straightening of shafting could be done without removing the work from the centers, and at the same time do it quickly and accurately. The

### SCOFIELD PATENT SHAFT STRAIGHTENER

meets just such a want; the apparatus is light and can be easily handled, yet it is of sufficient strength for the purpose required. It can be placed upon the shears of the lathe, and moved along the entire length of the work. It is especially

Adapted to Removing Short Bends, which frequently occur in long lengths of shafting. The lightness of the Straightener renders it eminently

Adapted for Line and Counter-Shafting, without necessitating the time and trouble of removing hangers and detaching couplings, but can be

Easily applied to the Shaft while in Position.

It can also be used on the bench for short lengths.

For Circulars, Price List, &c., Address,

C. SCOFIELD & CO.,

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OSBORN MFG. CO.  
TRADE MARK  
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The Original Inventors and Manufacturers of the  
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twelve different patents. We are continually bringing  
out new and beautiful designs to meet the demands of  
refinement and taste.

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JOHN MAXHEIMER,  
Manufacturer of

Japanese & Patent Eureka Bright Metal  
BIRD CAGES,

247 and 249

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NEW YORK.

— FULL SIZE OF —  
— WIRE CONNECTION —



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April 6, 1869; Dec. 23, 1873;  
Jan. 30, 1874; Dec. 22, 1874;  
April 30, 1875.

PAT. DEC. 23, 1873  
BLAKEMORE'S GRAVITY DOOR ALARM  
USE NO SPRING  
MANUFACTURED 3425 MARKET ST. PHILA. PA.  
SEND FOR CIRCULAR

H. CARTER

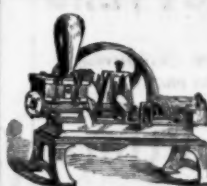
290 Pearl Street, New York.



Potter's Patent  
STEP LADDERS.

Manufacturer of and Dealer in all descriptions of  
Moulders' and Plasterers' Tools,

And Dealers in  
General Hardware, Glazed Copper Weather Vanes,  
CARTER'S PATENT CARRIAGE LIFTING JACK, &c.



JAS. CLAYTON,  
Manufacturer of  
Water, Air, and  
Vacuum Pumps and  
Air Compressors.  
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culars.  
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Tackle Blocks  
Of all Description.  
SHIP BLOCKS,  
Well and Ships'  
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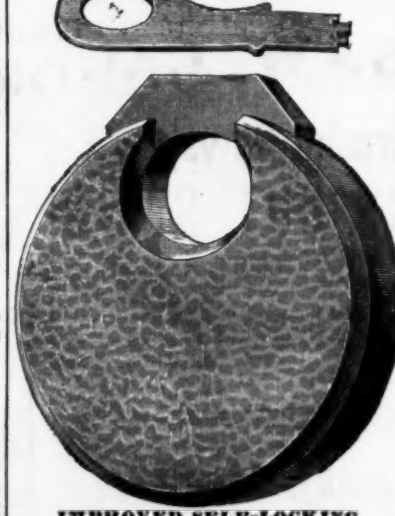
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## Foreign Opinions of the United States.

Our foreign visitors, judging from some of the letters they have sent home and that have been published and returned, are gathering different impressions of American manners and civilization from those that were disseminated a few decades since. They all speak of the marvelous material resources, of the endless railways, the exhaustless mines, the abounding factories, and an agriculture that vast as it is only begun. Coincident with this we find gracious and complimentary notices of social gatherings; of brilliantly lighted and decorated rooms, enriched by throngs of beautiful women, beautifully dressed and full of cultivation.

One correspondent alludes to the profuse employment of flowers in internal decoration; and the wonderful effect of freshness, light and natural beauty on rooms crowded with achievements of art, making floral decorations a distinctive and distinguishing feature in American society. Another speaks of his astonishment in finding that a small evening party of Americans contained individuals who had visited every portion of the globe, including his native town; spoke almost every language; knew the history, the employments, the achievements, the distinguished personages of the countries they had explored, as well as their own, and could render the world's music. Another alludes to the high special education he found in technical and professional callings, as well as that general knowledge that is always remarked. All refer to the unquestioning confidence in the complete reunion of the Union and in a future more august than was previously conceived.

The letters have a different and less complimentary strain; but this is predominant. Coming from so many observers, writing without the expectation of influence here and seeking only to chronicle personal impressions, we cannot but believe that the substance of all the letters to Europe by all the throng of visitors drawn to the Centennial and scattered over all parts of the country, will create a higher impression of American culture than has ever heretofore obtained abroad—an impression that, as it is built upon great political and material accomplishments and endless resources, will win for us a higher and more desirable reputation than we have ever enjoyed. So far the David Crockett, Yankee Doodle type does not seem to have been encountered, as was expected, and the contrast and the positive merit met have certainly acted as missionaries in our behalf. This is not the least advantage of the Centennial, and we trust first impressions will be fully confirmed.—North American.

The English Board of Trade returns for June exhibit a decline in the exports of steel from Sheffield, which, on reflection, make a showing relative to the falling off in the manufacture there that is of no mean significance. The exports of the principal articles show a decrease of 22 per cent. from the total of the first half of last year, while the exports for 1874 were 18 per cent. less than for the corresponding period of the preceding year. In short, loss of \$4,000,000 is shown on a six months' business of £18,000,000, and we have a statement from good authority to the effect that the diminution of foreign trade in iron, steel and hardware goods generally is greater than in almost any other large branch of English manufactures. It is true that the decrease in the money value of hardware exports is greater than in the quantity, but the diminution of quantity is important. The Sheffield Independent states that while the exports of steel are falling off, the imports continue as large as ever; and further, that "the explanation is to be found in the fact that we are exporting steel at an average price of £36 a ton, and importing it at £15 a ton. Of course there is a vast difference in quality, but that is just where the shoe pinches. In regard to the commoner qualities of steel in which price rules, foreign manufacturers are not only driving us out of their markets, but competing with us in our own." Taking the first six months of the year as a criterion, it is shown that Sheffield is exporting, in round figures, home and foreign steel at the rate of 29,000 tons a year, and importing foreign steel at the rate of 10,000 tons a year, and while the exports are decreasing at the rate of 4000 a year. It is admitted by manufacturers that, while a more depressed feeling has prevailed in past years, and work curtailed to smaller dimensions than at the present time, the pressure of foreign competition has never before been so seriously felt as now.

We have lately had an opportunity, says Engineering, of examining several specimens of glass manufactured under the patent of Mr. Bashley Britten. The process consists in using the slag from iron furnaces in its liquid state direct from the blast furnace. The slag is conducted while in a liquid state into a tank holding about 15 cwt., where it is mixed with other materials, and in an incredible short space of time, as compared with the ordinary method, glass is produced. This glass is acknowledged by the workmen to be of an exceedingly soft or plastic nature. It is perfectly acid proof and capable of use for all purposes for which the best bottle glass is suitable. It cuts readily with the diamond, and is available as rough plate for roofings, skylights, greenhouses, roofing tiles, and for many other uses from which glass as heretofore manufactured is, on account of its cost, necessarily shut out. Specimens have also been produced of this glass colored brilliantly, and suitable for the purpose for which colored glass is employed. A private company has been formed and will shortly be registered with a capital of £200,000, for carrying out the manufacture of glass under this patent on an extensive scale.



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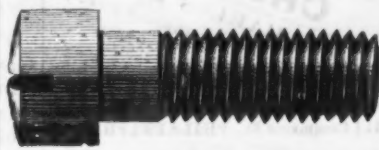
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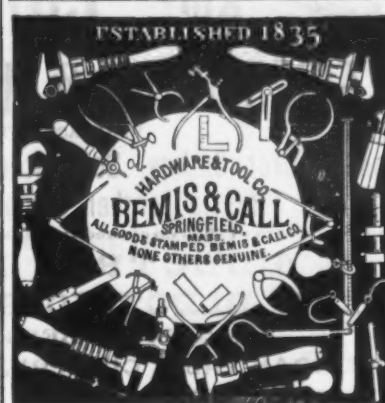
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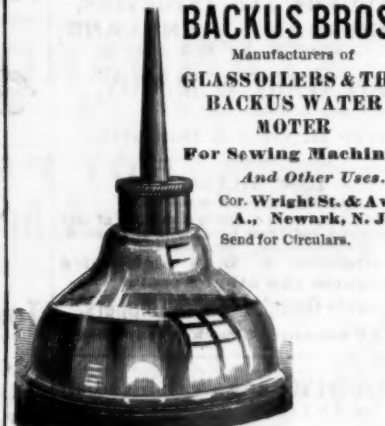
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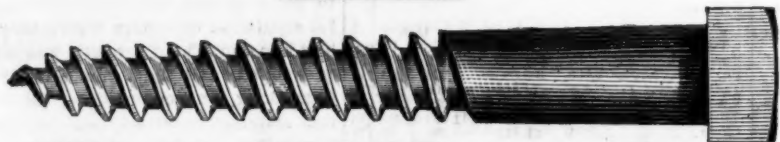
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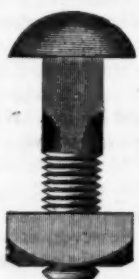
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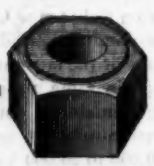
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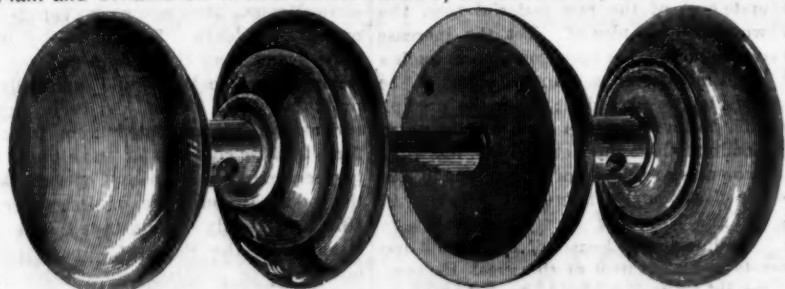
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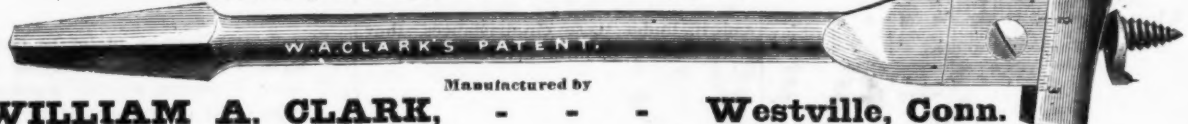
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# The Iron Age.

New York Thursday, August 17, 1876.

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JAMES C. BAYLES, Editor.  
JOHN S. KING, Business Manager.

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### Some Conditions Affecting the Future of Manufactured Iron.

The present outlook in the merchant iron trade is about as dismal, in some of its phases, as could well be imagined. It is not so much the prices we refer to, as to the conditions which have made and are making prices. These are such that they augur little that is hopeful in the immediate future, and indicate a demoralization that will be difficult to cure.

The first of these depressing conditions is, to use the words of a prominent iron manufacturer, "competing with 20 cents on the dollar." We have not reached the end of failures in the iron business. There are mills that are sure to go into bankruptcy if the present condition of affairs continues. In the struggle to keep afloat and to put off the evil day as long as possible, hoping that something will happen to help them, iron is sold without regard to cost, and every ton made is not made for profit, but to raise money at any cost to meet the note due to-morrow. What the iron cost is not the concern of the seller, but what he can get for it. Doubtless this is often done in the honest hope that if this note only is met all will be easy afterward, but we are afraid that in many cases the one who fails would as soon fail for five hundred thousand as for one hundred. Now this is one of the conditions which fixes prices for the mill owner that can and will pay 100 cents on the dollar. True, he need not meet it un-

less he chooses, but if he does not he must shut up his mill, and that oftentimes he cannot do without a loss of which outsiders have but little conception. The expenses for organization, taxes, interest, insurance, watchmen and a thousand and one things go on. He may be getting orders for some specialty that pays, and can afford to run his mill much cheaper than he otherwise could, and the loss of trade through inability to supply orders is an item of no inconsiderable moment.

Another fact that goes far toward making the price of iron, is that a few mills have refused so far to join the efforts that are being made to establish and maintain prices. They remain outside and openly announce their intention to shade established prices. There are not, as one would naturally suppose, strong concerns that can afford to take this stand, but in many cases weak ones. They do not claim that the prices established are any more than the iron should bring, but with a spirit for which it would be difficult to find a name, they desire their rivals to make prices and bind themselves to sustain them, while they remain free to cut those prices just enough to take the orders.

Bad as this is, there is a worse feature still, and that is that manufacturers who have bound themselves to adhere to certain prices will use the most contemptible subterfuges in selling iron, so as to keep the letter of the contract only to break its spirit. Such a policy is anything but manly or honorable.

It is the knowledge of such facts as these that make us despair of any permanent improvement in the iron trade, until those who thus stand in the way of healthy recovery are crowded out of the trade. We cannot see how bank officers with a due regard for the great interests entrusted to them, can grant accommodations to such parties. Probably they would not were they aware of all the facts of the case.

Still another cause of anxiety is found in the present aspect of the labor question. There have been labor troubles before, but never have the conditions been so promising for the success of the unions. They are flushed with victory, even at a time most unpropitious for a strike. With iron down, a weak market and few orders, they made a demand, and got what they asked; and if, under these circumstances, they were successful, now that they have a union of all iron and steel workers, what will be the result of their demands if iron should ever take an upward tendency? Coupled with their victory, is the humiliation they have put upon the manufacturers in compelling them to sign the contract demanded. The manufacturers have lost an opportunity that will never come to them again, but it is not too late to repair the loss, though the cost will be greater. They too must organize. Narrow and short-sighted selfishness, which almost always characterizes the policy of capital, must, for once, give place to enlightened self-interest. We must have a national federation of employers representing all branches of the iron trade, or we shall have in this country a labor problem quite as serious as that which has steadily undermined the industrial prosperity of Great Britain during the past ten years.

### Honest Rails.

Our comments on the organization of an Iron and Steel Rail Inspection Bureau in the West, to purchase rails for the railroad companies, have been very severely criticized by several of the railway journals. As our information concerning the organization of the Bureau was gained from an extract from the *Railway Review*, that journal takes us to task somewhat sharply for venturing to differ with its expressed opinions on the subject. It is not in accordance with our custom to waste space in discussing questions of opinion with our neighbors, but when our views are misrepresented and our statements discussed without quoting them, it is perhaps due to ourselves to correct any mistakes which may thus arise.

The only point of difference between us and the *Railway Review* seems to have grown out of our very confident and, we think, easily substantiated assertion, that the railroads can get good rails whenever they are willing to contract with responsible makers at fair prices. If this be true, we fail to see the necessity for a Bureau of Inspection to be paid a commission for rendering the companies services they have no need to pay for. Railway managers are not such innocent, confiding people that they need employ some one to protect them against dishonest mill owners. They can get first quality rails in any quantity, with the makers' guaranty, and, if further assurance is needed, they have their own engineers who can make all necessary experimental tests. The *Railway Review* does not seem, however, to

have so good an opinion as this of the intelligence of its constituency. It says:

As we said before, one trouble in the purchase of rails lies in the fact that many purchasers do not know just what they want. They know little or nothing about the requirements of a good rail, and if they give their order thus ignorantly they place themselves entirely in the hands of the rail makers. It is no easy thing to tell a good rail from a bad one after it is completed. Now if these purchasers choose to avail themselves of the knowledge of a "Bureau" of experienced, qualified men, who will watch the process of manufacture and see that everything is done right to make a good rail, why should they not do so. One thing is certain, no reliable rolling mill company will think of taking offense at such action. As a matter of fact, many railway companies have men at the mills which make iron for them, to look after their interests. The mill companies like to have it so. Now why should they or any one object to the employment of the experts of a "Bureau." From the view of the makers even, this plan has some good points. It shuts off future complaints from the buyers. It is often, indeed usually the case, that when new or old rails are weighed by the mill and by the railway company in different places and on different scales there is a discrepancy. If both parties were represented when the weighing is done at the works this would be avoided. The indignation of *The Iron Age* at the formation of such a Bureau is, therefore, uncalculated for and unnecessary.

We are very strongly of the opinion that the "trouble in the purchase of rails" does not lie in the fact that many purchasers do not know what they want. It would be much nearer the truth to say that many purchasers know they want rails at the lowest price at which they can be had, and do not care much, if anything, about quality. We were one day in the office of a prominent dealer in railroad supplies, and there listened to a conversation which, though somewhat startling, was not, we were told, unusual. A contractor came in to talk about buying a lot of rails for a Western road. "I want," said he, "just 'the lightest and cheapest rails I can get.' 'I don't care a—what they are made of, so that I get them cheap enough.' This, in effect, was his demand. Whether his order was filled or not, we are unable to say, but it is probable he succeeded in buying all the rails he wanted for a price which, while satisfactory to him and those he represented, would not cover the net cost of a good iron rail heavy enough to stand even the light traffic of a partially completed branch line. Of course, rails are not always, if often, bought in this reckless, criminal way, and we merely instance it as showing how it is that so many cheap rails of poor quality have come into use.

If railway managers prefer to employ the services of a Bureau in buying rails, they have, of course, a perfect right to do so—by and with the consent of the stockholders. We have no prejudice against this or any other Bureau or association, but we have a decided prejudice against the payment of commissions for unnecessary services. If a railroad superintendent who is ordered to buy rails does not know what his road wants, cannot draw up the specifications of a contract and see that the rails he gets are just what he ordered, the sooner he is discharged and a new man appointed, the better.

In point of fact, "the trouble in the purchase of rails" is neither ignorance of the requirements of the roads nor the difficulty of determining the quality of finished rails. The real trouble is that railway managers are corrupt and venal, and that too many people want a share of the profits of a rail contract. The roads which would be benefited by the labors of an honest Bureau of rail inspection are the very ones which would have nothing to do with it; and until we have, as railway managers, men who are honest enough to be content with their salaries and dividends on the stock they own, we shall have a market for poor and cheap rails.

The *Railway Review* does us injustice in intimating that we expressed "indignation" at the formation of a Rail Inspection Bureau. We did nothing of the kind, and have no reason to. If we felt any indignation at all, it was at the accusation, by implication, that the railroads were systematically swindled by the rail makers, and that there was need of a detective system to watch the latter, as well as an inspection system to test their products. This was a fair inference from the remarks of the *Railway Review* on the necessity for a rail inspection bureau, and its subsequent disclaimer of an intention to thus insult the rail mill owners of the country robs its original argument of all weight. There are mills which make miserably poor rails, but we doubt if a ton of such rails is bought in a year by people who imagine they are getting good iron, or who want good iron. On the other hand, there are a score of mills standing idle which would contract to furnish any quantity of rails to be delivered with a guaranty that size, shape and quality should be exactly according to specifications. Such orders will be taken at prices which will leave for profit a margin barely wide enough to cover contingencies and guaranty, and the mill owners will not object to any reasonable amount of private oversight and inspection. It is with rails as with everything else—a con-

sumer can get just what he is willing to pay for, and under existing conditions he can get it cheap. If, however, our railroad managers think that they can buy through a Bureau good rails for less than good rails are worth, they will incur the risk of being doubly deceived, if not doubly cheated.

### The Quicksilver Markets.

The rapidly increasing quicksilver production of the State of California, and the corresponding decline in the value of the metal, have powerfully contributed to stimulate the production of gold and silver, especially the latter. While quicksilver ranged between 80c. and \$1.38, gold, in California, as was the case from 1871 to 1875, the poorer ores could not be worked to advantage, and but for the extraordinary richness and abundance of ore, both gold and silver, in the Comstock mines of Nevada, dear quicksilver would have meant a decreased output at least of silver. The decline in quicksilver to 40c. and 50c., gold, at San Francisco, this year, has enabled silver mines, even of the poorer class, to push their industry with the utmost vigor, and the year bids fair to prove a most bountiful one in the amount of gold and silver which add to the wealth of the United States.

The production of the Western Slope of the Rocky Mountains for the current year is estimated by competent judges at the following rate per day:

|                                    | Silver.   | Gold.     |
|------------------------------------|-----------|-----------|
| Nevada                             | \$135,000 | \$75,000  |
| California                         | 15,000    | 75,330    |
| Utah                               | 15,000    | 8,000     |
| Oregon, Arizona, Montana and Idaho | 12,000    | 11,000    |
| Colorado                           | 13,000    | 10,000    |
|                                    | \$167,000 | \$182,330 |

300 days.....\$50,100,000 \$54,699,000, constituting a total output of the precious metals of together some \$105,000,000.

The five leading quicksilver mines of this country produced 39,542 flasks of quicksilver in 1875, as follows:

|               |        |
|---------------|--------|
| New Almaden   | 14,000 |
| New Idria     | 8,600  |
| Redington     | 8,000  |
| Sulphur Bank  | 5,215  |
| Great Western | 3,647  |
|               | 39,542 |

The following proves to have been the world's production in 1875:

|                           | Flasks. |
|---------------------------|---------|
| California                | 39,542  |
| Spain                     | 36,000  |
| Idria (Austria)           | 8,000   |
| Germany (Palatinate, &c.) | 2,400   |
| Italy                     | 2,700   |
| Borneo                    | 2,000   |
| Mexico                    | 900     |
|                           | 106,700 |

California's production during 10 years:

| Year | Flasks. | Value.  |
|------|---------|---------|
| 1866 | 46,550  | \$1,881 |
| 1867 | 37,000  | 30,306  |
| 1868 | 37,000  | 32,600  |
| 1869 | 37,718  | 34,254  |
| 1870 | 29,546  | 63,706  |

California's export by sea for the first six months of 1875 and 1876 has been as follows:

|                  | 1875.   |           | 1876.   |           |
|------------------|---------|-----------|---------|-----------|
| To               | Flasks. | Value.    | Flasks. | Value.    |
| New York         | 12      | \$1,423   | 1,975   | \$87,456  |
| Mexico           | 2,605   | 302,050   | 2,934   | 131,714   |
| Chili            | 355     | 34,803    | 400     | 17,611    |
| New Zealand      | 35      | 1,898     | 308     | 9,310     |
| Marche           | 4,363   | 201,689   | 11,303  | 489,513   |
| Japan            | 306     | 31,845    | 306     | 9,181     |
| Central America  | 4       | 200       | 117     | 5,056     |
| British Columbia | 10      | 526       | 4       | 180       |
| England          | 100     | 7,650     | .....   | .....     |
| South America    | 1,029   | 35,516    | 867     | 37,395    |
| Australia        | 302     | 31,959    | 473     | 30,325    |
| Calcutta         | 10      | 450       | .....   | .....     |
| Russian Asia     | 3       | 195       | .....   | .....     |
| Totals           | 9,965   | \$690,764 | 18,437  | \$812,812 |

The export in July was but 2128 flasks, against 3197 in 1875, China during the month taking 2000 flasks less.

### ACTUAL RECEIPTS AT SAN FRANCISCO.

|                    | 1875.           |                   | 1876.           |                   |
|--------------------|-----------------|-------------------|-----------------|-------------------|
| Jan. 1 to July 31. | Bay.<br>flasks. | Coast.<br>flasks. | Bay.<br>flasks. | Coast.<br>flasks. |
| January.....       | 1,505           | 2                 | 3,877           | 281               |
| February.....      | 3,251           | 399               | 3,864           | 62                |
| March.....         | 5,770           | 465               | 3,789           | 154               |
| April.....         | 3,718           | 110               | 4,313           | 317               |
| May.....           | 3,298           | 303               | 4,954           | 304               |
| June.....          | 3,776           | 320               | 5,368           | 398               |
| July.....          | 4,229           | 428               | 4,510           | 383               |
| Totals.....        | 28,699          | 1,927             | 30,648          | 1,863             |

It will be seen that the export has nearly doubled, and that China has, in proportion, taken considerably more than it drew from California last year during the corresponding period. If during the latter half of the current year California keeps up the same proportion of increase, and the remaining countries do not diminish their output, it seems evident that some 10,000 to 20,000 flasks will be added to the world's supply in 1876. Consumption, on the other hand, has, no doubt, vastly increased throughout the universe, especially in China, whose capacities of absorption for the manufacture of vermilion, &c., are evidently much greater at a moderate cost of the raw material than the world had any idea of. Yet the increase of production has been going on at such a rapid rate that consumption seems to be considerably exceeded; hence the precipitate decline that has been witnessed in London, where the metal which, less than two years ago, was worth from £21 to £24 per flask, lately fluctuated between £7 and £9.

Although the house of Rothschild has retained its control of the great Peninsular mine, the increase of production in California has removed the center of in-

terest in quicksilver from London to the shores of the Pacific, where we have at the same time the bulk of production and of consumption.

The great impulse given to quicksilver production in California has subserved most admirably the interests of mining the world over, and we trust that in the present value of the metal enough profit may be left the producers to enable them to go on at the present rate of output, and that they may not be compelled to curtail the latter. As early as January of the present year they ventured gloomy predictions as to the future of the quicksilver interest, but the subsequent increase of output proves that it pays them to continue, and as long as this impression prevails it is not likely that prices will materially recover, unless it could be demonstrated that consumption has again caught up with production.

### Amalgamation.

There are generally several ways of looking at a thing. This may not be a startling truth, but it is certainly a safe assertion. For example, the editor of the *Labor Tribune* takes a view of amalgamation which, we think, differs in some respects from that which any other person has taken, or is likely to take. He compares it to a triple marriage, arranged, we should say, something after the plan of Midshipman Easy's triangular duel. We quote as follows:

It is not at all strange that the boilers of the United States should now drop a tear at the transformation just effected. They now bid farewell forever to the United Sons of Vulcan, an organization that they have loved to revere, an organization that has led them successfully through a score of bitterly fought contests. That name is associated with many sweet memories. As the mother takes her loved daughter by the hand at the marriage altar and with tearful eyes and joyous heart hands her over to her new husband, so do the boilers of the United States go to the marriage altar of amalgamation and there tearfully but joyously surrender their pet child of 20 years to the new husband, amalgamation, to nourish and cherish, in sickness and health, for weal or woe, until death do them and all of us part. Crown our sweet bride with garlands. She is not ours any longer, but another's and yet ours, and we are her's. Welcome the sight. Celebrate the day. Our brothers of the Associate Brotherhood of Iron and Steel Heaters, Rollers and Roughers of the United States, have led their bride to this altar and surrendered her. They too feel that in surrendering the separate existence of their organization they are closing the pages of an interesting book whose every line and word records their many struggles to establish and perpetuate the eternal principles of justice and equality to all men. Their young organization was growing like a young giant proud of his strength and ambitious to shine. She too steps upon the altar and fades out of sight for a moment, and reappears transformed into the strong giant, amalgamation.

This is very pretty, but the interest of the occasion was somewhat lessened, we should suppose, by the knowledge that these fair brides, which were given so tearfully yet joyfully to polygamous amalgamation, were not quite all that they should be. In point of fact, they had rather a doubtful reputation in circles where they were best known. Their veracity was not unquestioned, and they were anything but fair, young, innocent maidens. Moreover, the marriage contract was so loosely drawn that proceedings for a divorce on the ground of incompatibility of temper would soon be in order, and those who had most interest in consummating the nuptials must have strongly suspected that the members of the happy family thus created would, before long, have each other by the hair in anything but love and amity. Without wishing to do any injustice, we very much fear that the marriage in question was one of expediency, and that none of the contracting parties will have any reason to be proud of the issue. However, as we said before, there are several ways of looking at a thing.

### Steam on the Erie Canal.

The sale of a portion of the property of the Baxter Steam Canal Boat Company took place on Tuesday at the Exchange Salesroom, on a chattel mortgage foreclosure. The patents and patent rights were sold for \$3000. The boats William Baxter, City of New York, William Newman, City of Buffalo, City of Albany, City of Rochester, City of Syracuse, City of Troy, City of Ilion, City of Newark, City of Utica and Remington, together with their engines, boilers, machinery and all appurtenances, were sold for \$14,300. The hulls, without machinery, of the steam canal boats Chicago, Milwaukee and Detroit were sold for \$3000. The buyers were Messrs. Remington & Van Dyke, mortgage holders. The company built more boats than they could pay for, believing that the line would eventually be profitable. The reason why these expectations were disappointed were fully set forth in these columns at the close of the first season of the company's operations on the canal. In our issue of December 18, 1875, we clearly demonstrated that the steamers of the Baxter Company could not be run in profitable competition with horse boats, for the reason that the screw was not mechanically adapted to canal



service. The fate of the enterprise shows that we were right. The company's liabilities are about \$100,000. In view of these facts, the suit of Mr. Baxter against the State to recover \$135,000 to which he claims to be entitled on account of his invention, seems to be based upon an assumption which it will be difficult to sustain.

It is now many years since attempts were first made to move the tonnage of the Erie Canal by steam power, and it must be confessed that much of the money expended in experiments has been wasted. Had inventors and their "backers" given the problem intelligent study in all cases, and avoided repeating, over and over again, failures of which accurate and complete records were obtainable, much of this large capital would have been saved. Among other things, it has been clearly shown by experience that screw propulsion cannot be employed with economy on the canal. Eighteen years ago propellers were withdrawn from the canals which rendered better service than have ever since been rendered by any steamers capable of passing the locks. Experience has also shown that it is quite as impossible to apply steam power to each boat as it would be to provide each freight and passenger car on a railroad with independent propelling machinery. If steam is to effect an important economy over horses on the canal, we must so apply it that barges can be towed in trains, with all their capacity, as now, utilized for cargo, and with no expense for power when none is used. Mr. Baxter's experiment was probably made in good faith, and in the belief that he could obtain from one of his engines sufficient power, with so great an economy over the more wasteful engines employed fifteen to twenty years ago as to make twin-screw propulsion practicable. We can only regret, however, that the conditions of success were not more carefully and intelligently studied from the performances of the first two boats, the "Baxter" and "City of New York," so that subsequent unprofitable investments of capital in the same direction might have been avoided.

#### Multiplying One's Hands.

"I wish I had two pairs of hands" is an expression frequently heard from both the workman and the manufacturer. It is an expression of the feeling that the production possible with one pair of hands is out of all proportion to the amount of time employed or the amount of energy expended. The mechanic who experiences this feeling knows that too much time is lost in preparations or wasted in trifles, but it does not always, if often, occur to him that it is possible to make his brain supplement his muscles to an extent which shall render his hands more than doubly productive.

We cannot do better by way of illustrating the way in which one's hands may be multiplied, than to tell the story of a "down East" Yankee who built and ran a brass foundry in one of our small Eastern cities. The building he purchased was a small one, consisting of a single room. One corner was cut off by a partition, and part of this space was used for an office, while the remainder formed the engine room and boiler house. Power was supplied by a small portable (oscillating) engine and boiler, the latter set in brick by the owner's hand, and the engine, which was very pretty, mounted on a wooden stand, also his own work. This was the nucleus. A large addition was put up and he moved in, and began the manufacture of his machinery and fixtures. The furnace was his own work, but the chimney was built by a mason. Then came the first step toward multiplying his hands. While melting, it was necessary to regulate the blast by running the engine faster or slower, as the case might be, and to do this it was necessary to step into the next room and give the throttle valve a turn or two. This only required a quarter of a minute and a few extra steps, an amount of labor so small that it would not have been noticed by most men; but in the course of a few weeks a line of light wooden shafting was run along one side of the shop, and upon it skeleton pulleys were arranged, so that by using ropes which hung from them the shaft could be revolved. In the engine room the movement of this shaft was arranged to open and shut the throttle. In another week rope belts in various convenient positions enabled him to control the speed of his engine, without the loss of time, from any part of the shop where he might be at work. When at the further side of the molding room, some 70 or 80 feet away, this was decidedly a saving. Bells upon doors, signs to indicate where he was to be found when absent from the front room, tell-tales to indicate low water alarm and whistle to give warning of an increase of steam pressure beyond the point of safety, and innumerable other simple devices were combined to make it prac-

tically possible for the man to be "in two places at once." The pressure gauge watched the steam, and was ready to call attention at the moment it was needed. The card at the door told the visitor just where the man was to be found, and so in a dozen ways he duplicated his personal attention without expense. To the saving of labor, however, his efforts were chiefly directed. Living in a seaport town he found a demand for brass spikes. These had usually been sharpened by hand, but before he got the second lot off a milling wheel, driven by a belt from the main line of shafting, cut the points about as fast as the spikes could be handled; and in case a large lot was wanted a boy could do the work without difficulty, while he could go on with the more important work of the foundry. The pattern makers' lathe, with which he began, was soon transformed, partly by purchase and addition of parts made outside, but mostly by improvements made in the foundry until, at last it became an automatic feed lathe, very complete in its details and so perfectly adapted to the work of the shop that, to an outsider, it would have been impossible to make an improvement. The amount of work which could be turned out from it was enormous, while the amount of labor and time expended in running it had been reduced to a minimum. In handling castings, in making molds, in finishing, and in the thousand and one different operations of the shop, it seemed as though everything had been so arranged in his mind that the fewest possible motions were needed to do the work. Even in going about it seemed as though he never wasted a step and never did a thing the wrong way. Certain it is that he never tolerated for a single day a machine which could be improved in its operation or made more convenient to the workmen. The shop was a study. The man by using his brains was able to accomplish just about the same quantity of work in one day that another man, with a shop fitted up in the usual way, would have done in two.

As a contrast to this, we call to mind an incident that occurred in one of the largest tube and pipe works in the country. On going through them we were struck, in one of the rooms, with the method used for cutting the threads upon large pipes. They were lifted from the railway trolley on which they had been brought to the lathe from the pile, and placed in the lathe; then a man, stooping by the side of the lathe, took a spanner from its hook, put it upon the head of a binding screw, and gave the screw at least two whole turns, replaced the wrench on the hook and then started the lathe. The whole operation lasted scarcely half a minute, so expert was the operator, yet more than half the time was lost in turning the screw home with the spanner, hanging up and taking down the latter and in releasing the pipe. We asked the proprietor: "Why 'don't you arrange a quicker method of clamping the pipe, or at least a more convenient and easier managed form of wrench?" The reply was: "The man 'works by the piece, and it does not make 'any difference to us.' In the same works there was a railway track with turntables, connecting every room with all the departments of the works, while many conveniences for handling the metal were at hand, yet the firm utterly disregarded conveniences for the workmen when it was a matter of piece work. In another shop pretty well crowded with machinery, the stuff for one of the lathes had to come the whole distance across the shop, some 50 feet, from another machine, and then go back to another machine near the point from which it started. We have seen work as it left the machine allowed to drop upon the floor from the hand, and afterward it had to be gathered up into an orderly pile, a work usually falling upon the attendant of the machine. Such things ought not to be allowed for a moment, no matter whether the work is done by the piece or by the day. Nor should it be allowed even in a business where economy is not especially necessary.

Such methods of waste are very frequently seen in unskilled laborers under contractors. A man wheeling dirt all day over rough ground instead of over a line of planks laid down, is no uncommon sight, and is, perhaps, a fair example of the waste of labor and a marked contrast to the policy of the owner of the brass foundry before mentioned, who would not walk across his shop unnecessarily.

It may be accepted as an axiom that the right way of doing a thing is the easiest way. A leisure hour cannot be better employed by the mechanic or the manufacturer than in devising means of simplifying labor and making it easy. In this way, and this only, can we secure the largest results with the least waste of energy. More men are broken down and worn out by making their hands do what the brain should have done for them, than by the necessary "hard work," of which some

share falls to every man. It is a good policy to see that the ways of life are well lubricated, and that there is no unnecessary friction.

#### New Publications.

PROCEEDINGS OF THE FIFTH SEMI-ANNUAL MEETING OF THE NATIONAL ASSOCIATION OF STEEL MANUFACTURERS OF THE UNITED STATES, AT PHILADELPHIA, JUNE 14th and 15th, 1876.

This report, the main features of which were anticipated in the report of the meetings published in *The Iron Age* of June 18th, is a document which we should be glad to see in the hands of every stove dealer in the United States. We do not suppose that the number printed would admit of any such general distribution, but we should be glad if it were so. The able address of Mr. S. S. Jewett, president, and the calm, intelligent, thoughtful debates of the members cover a wide range and include nearly all topics of interest to the stove trade. It was an exchange of ideas and experiences between the men who make stoves, which would enlighten those who sell them on many points concerning which most of them now have very vague and uncertain notions. From this discussion they would learn a great deal which it would be well for all in the stove trade to know and think about, and we hope that all who have access to the report—both manufacturers and dealers—will read it carefully. We have no doubt, although we are not authorized to say so, that copies can be obtained by addressing the obliging secretary of the Association, Mr. Josiah Jewett, of Jewett & Root, Buffalo, N. Y., until the edition is exhausted.

#### Principles of the Construction of the Steam Hammer.

BY EDWIN L. WALLIS, M. E.

In the course of visits to shops in various parts of the country, the attention of the careful observer is generally drawn to a comparison of the efficiency, design and construction of the various machine tools which come to his notice. Some are models of elegance and lightness, while others designed for the same purpose are exceedingly heavy and clumsy. Within the wide ranges of difference sometimes observed there are certain proportions most suitable to a given case, and to determine these proportions, in order to secure the highest efficiency with the least expense of construction, is one of the most important divisions of the engineering profession.

In the course of the investigations necessary to secure these results, there usually exist, and demand consideration, two classes of stress quite distinct from each other: The 1st, where the stress is static and proceeds from a force applied either gradually or suddenly; and 2d, where the stress is dynamic, and is caused by taking up a certain amount of the mechanical work existing in a moving mass—or in other words, is caused by a blow. The laws of the strains produced by stresses of the first class are well understood, and the proportions necessary to resist them have been many times determined; but the strains produced in a given material by a blow upon it not only are not accurately known, but depend upon conditions very difficult, if not impossible, to introduce into a calculation. Under these circumstances, the last resort is to approximate as near as possible to the strains produced, and then by actual trial test the accuracy of the approximation. There are various methods of approximation, all depending upon a static stress, and the distortions produced thereby; or, as expressed by the principle, the work expended on a material equals one-half the product of the force applied into the distortion produced.

I am well aware that the application of the principles of mechanics to the construction of machine tools is very generally not made, and the relative proportions are determined entirely by the judgment and experience of the designer. Owing to the difficulty of analyzing strains, it is seldom done, and when machines of new design are to be built, the designer proportions the parts according to his judgment, and when the machine is constructed and in use the parts which give way first are successively strengthened until by repeated experiments a certain degree of uniformity of strength is secured for the whole machine. To be sure, results obtained experimentally are reliable, but experiment is expensive, and the reduction of the expense of construction is an object to be kept always in view. In no machine tool has this method of construction been more closely adhered to than in the steam hammer, and the hammer as it stands to-day is the result—I might almost say the design—of 35 years actual use.

In this paper I shall not attempt to criticize or compare closely hammers already existing, but simply to assume a hammer of a standard form and apply to its construction principles which being invariable require but a repetition of the work to apply them to any hammer. The mere fact that the proportions of the hammer have been experimentally determined is no reason why such principles as bear upon it should not be applied. Of course there is no dispute that a hammer proportioned without analysis will work, and will probably satisfy those for whom the fact that "it works well in practice" is a good and sufficient reason for everything, but it cannot realize the finer qualifications of a design.

In proportioning machinery we must, however, remember that it is better to err on the side of strength than on that of weakness, and wherever there arises a doubt to use a sufficiently large factor of safety. Although this may increase the cost of construction, still we thereby secure rigidity, a quality almost, if not quite, as essential as strength itself, and which is to be secured only by massive machinery. To avoid writing abstractly we will assume a

hammer to be worked under given conditions and determine proper proportions, the subject being taken up in detail, and the principles which bear upon the construction of each part severally examined. This method of treating the subject has been selected as the most natural way of applying mechanical principles to mechanical work. The hammer chosen as the type is that known as the Naamath hammer as, in my opinion, this pattern secures for general forging purposes and for large hammers the most advantages with the fewest defects. Accordingly, the details of the pattern will be taken up and treated in the following order: 1, cylinder; 2, valve movement; 3, ram; 4, frames; 5, sub-structure of frames; 6, anvil block and sub-structure; 7, anvil block and ram; 8, piston rod; 9, piston; 10, boilers.

The following are the conditions assumed to be fulfilled:

The moving weight weighs 15 tons=30,000 lbs.

The steam cylinder is 3 ft. in diameter.

The length of stroke is 8 ft.

The hammer is worked at a steam pressure of 60 lbs. per sq. in.

The width between standards is 30 ft., and the height under the standards is 9 ft.

Assume that the friction equals 1 per cent., and the back pressure equals 2 lbs. per sq. in.

CYLINDER.

On the down stroke we have the following conditions:

Area of cylinder..... 1,017 sq. in.

∴ Total pressure of steam..... 61,041 lbs.

Friction = .01 of 30,000..... 300 lbs.

Back pressure..... 2,034 lbs.

∴ Effective steam pressure..... 58,707 lbs.

and the total force tending to drive the hammer down=58,707 × 30,000=88,707 lbs.

From the mechanical formula

$F = M \int v \, dv = \frac{30,000}{g} \int v \, dv$  from which we

get the acceleration on the down stroke

$\int = 95 \text{ ft. per sec.}$

Also the space  $s = \frac{1}{2} a t^2 \therefore t = \sqrt{\frac{2s}{a}}$ ; or, the

time required for a down stroke,

$t = \sqrt{\frac{2 \times 8}{95}} = .41 \text{ sec.}$

Also,  $v = \int a \, dt$ , from which we get the velocity

at the end of the stroke,

$v = 95 \times .41 = 39 \text{ ft. per sec.}$

Also,  $v^2 = 2gh$ , from which the height due the acquired velocity

$h = \frac{v^2}{2g} = 23.6 \text{ ft.}$

The work which the hammer is able to do is equal to the weight of the hammer multiplied by the height due the velocity, and this equals  $\frac{1}{2} M v^2$ . ∴ the work =  $v h = 15 \times 23.6 = 354 \text{ ft. tons}$ , and this figure represents the maximum amount of work attainable from the blow of the hammer.

On the up stroke we have the following conditions:

The steam pressure on the area of the piston rod must be subtracted from the total steam pressure in order to find the effective steam pressure.

The piston rod, as subsequently determined, is 9 inches diameter, hence the area is 63.6 square inches, and subtracting this from the area of the cylinder we have:

Effective steam area..... 954 sq. in.

Total upward steam pressure..... 57,240 lbs.

Back pressure and friction..... 2,334 lbs.

Effective steam pressure..... 54,906 lbs.

Force tending to raise the hammer,

$54,906 \times 30,000 = 24,906 \text{ lbs.}$

The acceleration on the up stroke, as found from the formula  $F = M \int v \, dv$  equals

$\int = 26.7 \text{ ft.}$

In order to use the steam economically and also to secure the cylinder against being knocked to pieces, it is necessary to cut off on the up stroke and use the steam expansively to drive the hammer the remaining distance.

To investigate the effect of cutting off at different points of the stroke we find the work given out by the expanding steam. The steam in the cylinder expands in an adiabatic curve, the equation of which is

$p \times v = \frac{10}{9}$

Now, the work given out during expansion

equals  $\int p \, dv = a \int \frac{p_1 v_1^{10/9}}{v^{10/9}} \, dv$  where  $a =$  the area

of the cylinder,  $l_1 =$  the length of stroke, and  $l_2 =$  the distance traversed before cut off. This added to the work before cut off, gives the total work. If  $p_1 =$  the initial pressure and  $r = \frac{l_1}{l_2}$  we

have work =  $a p_1 l_1 \times a \int \frac{p_1 v_1^{10/9}}{v^{10/9}} \, dv$ , from which the

work =  $u = a p_1 l_1 \left( 10r^{-1} - 9r^{-9} \right)$

To solve this equation for that value of  $r$  which will make the piston rise to the top of the cylinder is impossible. We may, however, by assuming values of  $r$  make a table showing the work given out by the steam when cutting off at different points.

The hammer is governed by a slide valve, and when we expand on the lower side we cushion on the upper side. This is not objectionable, because there is accumulated in the hammer a large amount of work, and unless this is taken up in some way, the top of the cylinder would be destroyed. For this reason cushioning on the top side is desirable, and for the same reason the cylinder has a large amount of clearance at the top, in order to give more room for a cushion. We assume a length of 6 inches for this clearance, in order to examine the effect of the cushion. The work taken up by this cushion in compression from the point of cut off, added to the work used by the back

pressure before cut off, added to the work required to lift the hammer through the stroke and the sum subtracted from the work given out by the steam give the amount of work remaining in the hammer at the top of the stroke. The work of compression is found as follows: Let  $p_1 =$  pressure above piston at cut-off = 15 lbs.

$l_1 =$  length of cylinder above piston at cut-off.

$l_2 =$  length of cylinder above piston at top of stroke =  $\frac{1}{2}$  ft.

$a =$  area of piston.

The work of compression equals

$u_c = a \int_{l_2}^{l_1} p \, dl$

The compression is treated as against an air cushion, the equation of whose curve of expansion is

$p \times v = \frac{1}{n}$

By integrating the expression for the work we get

$u_c = a p_1 l_1 \text{ hyp. log. } \frac{l_1}{l_2}$

From the formula for the work given out by the steam, and that for the work taken up by compression, the following table has been constructed:

| Point of cut-off. | Value of $r$ . | Work given out by steam, in ft. lbs. | Per cent. of a p. h. | Work required to raise ram, in ft. lbs. | Work taken up by back pressure before cut-off, in ft. lbs. | Work taken up by compression, in ft. lbs. | Total work taken up, in ft. lbs. | Work remaining in ram at top of stroke, in ft. lbs. |
|-------------------|----------------|--------------------------------------|----------------------|---|--|---|----------------------------------|---|
| 6 ft. 6 in.       | 1.66           | 343,440                              | 94                   | 240,000                                 | 12,204   | 122,040                                   | 372,000                          | 37,396  |
| 6 ft. 6 in.       | 1.66           | 372,060                              | 94                   | 240,000                                 | 13,221   | 91,530                                    | 372,000                          | 37,396  |

If the steam be not used expansively, but simply exhausted as soon as cut off, these values are somewhat modified:

| Point of cut-off. | Work given out by steam, in ft. lbs. | Work required to raise ram, in ft. lbs. | Work taken up by back pressure before cut-off, in ft. lbs. | Work against steam pressure after exhaust, in ft. lbs. | Work remaining at top of stroke, in ft. lbs. |
|-------------------|--------------------------------------|---|--|--|--|
| 6 ft. 6 in.       | 343,440                              | 240,000                                 | 12,204   | 122,040  | 37,396                                       |
| 6 ft. 6 in.       | 372,060                              | 240,000                                 | 13,221   | 91,530   | 37,396                                       |

From these tables we see the obvious advantages of using the steam expansively in the steam hammer as well as in the steam engine, the loss of the increased time required for the up stroke being a mere nothing. It now remains to fix the point of cut-off.

In the table it is assumed that the hammer starts at the bottom in its ascent. Where the forging is somewhat thick this is not the case, hence, if we cut off too early in the stroke, the piston will not in this case rise to the top of the cylinder, and a part of the force of the hammer is wasted. On the other hand, if we follow too far, the accumulated work in the hammer at the top of the stroke becomes excessive, and serious stresses are brought upon the cylinder in taking up this work.

It is considered best to limit the work remaining in the hammer at the top of the stroke to 25,000 ft. lbs. This partially provides against loss of fall when the hammer does not start from the bottom, and the strains produced in the cylinder by this excess, although severe, may be provided against. From the table we see that to come within this limit we must cut off at  $4\frac{1}{2}$  feet.

The clearance at the upper end having been assumed at 6 inches the compression of the cushion is readily ascertained. The cushion has been compressed from 4 ft. length at the atmospheric pressure to the remaining space  $\frac{1}{2}$  ft. long above the ports. Since the pressure varies inversely as the volume, the pressure above the piston at the top of the stroke is 120 lbs. per sq. in. We have then the initial space of  $\frac{1}{2}$  ft. =  $l_1$  at the initial pressure of 120 lbs. =  $p_1$ . Let  $l_2$  = the final space.

As we saw before, the work of compression

equals  $u = a p_1 l_1 \text{ hyp. log. } \frac{l_1}{l_2}$  and this equals the

work to be taken up, hence

$25,000 = 61,030 \text{ hyp. log. } \frac{1}{l_2}$

from which  $l_2 > 4$  inches and the pressure in the top of the cylinder at the moment of maximum compression equals  $p = \frac{p_1 l_1}{l_2} = 180 \text{ lbs.}$

per sq. in.

The maximum upward pressure on the cylinder cover is therefore 180,000 lbs., and the bolts and fastenings must be proportioned, by the well known laws for tensile stress, to bear this stress.

The clearance at the lower end of the cylinder must be sufficient to allow for the compression of the piston rod, anvil, &c., and to leave a proper amount for absolute clearance.

As subsequently determined, the total compression of all the parts subject to the blow is .0028 ft. = .0028 in.

The absolute clearance should be = .75 in.

Total clearance..... 1.61 in.

(To be continued.)



## Centennial Notes.

**RIEHL BROS.**  
Philadelphia. This firm, proprietors of the well known Philadelphia Scale and Testing Machine Works, have a very interesting display in Machinery Hall, section E. 8, columns 54 and 55. The exhibit is large and varied, and deservedly attracts a good deal of attention. We can only refer to a few of the exhibits, and will first name an 80,000 lb. railroad track scale, with patent double beam for weighing loaded cars. This scale appears to have been planned so as to combine strength with accuracy of record. The one on exhibition is only 30 feet long, but can be lengthened to almost any size by adding more sections of levers. By this means railroad companies and others are often saved considerable expense, as it can be adapted to any change in the length of cars (or other causes requiring increased length) with very little additional expense. Another feature in this scale is the rocking bearings, causing the entire scale to have a free, easy motion; the fulcrums being longer than is generally used, the sensitiveness of the scale is retained for a much longer period. The patented double beam has an ingenious balance ball that will not turn unless moved by the hand, being propelled back and forth by a wheel, thus preventing it getting out of balance, as the old style are liable to, without the knowledge of the weighmaster. Among their testing apparatus they have a 75 ton testing machine to test metals by tensile and crushing powers, and being a very complete machine it appears to attract considerable attention. Tests of iron, leather belting, &c., are made daily, so that it can be seen in practical operation, and enable interested parties to decide upon its claims to merit. A machine of 200 lbs. capacity for testing samples of cement, and one of 100 lbs. capacity for testing fine wire, twine, &c., can also be seen in operation. They also exhibit furnace charging scales, the motionless platform, coal, hay and cattle scales, depot and rolling mill and portable platform scales, parallel crane beam, &c., all of which appear to be of excellent quality, and highly creditable to the exhibitors and to the manufacturing interests of the city of Philadelphia.

**THE HULL & BELDEN CO.,**  
Danbury, Conn., have their exhibit of wrought iron and steel drop forgings in Machinery Hall, Section C, Column 73. In this display may be seen in great variety specimens of all the leading articles manufactured by them, among which we may mention the "Climax" pipe wrench (described in *The Iron Age*, July 27th), which is made of best tool steel, and forged solid from the bar; wrench bars, which are drawn from bar iron, and headed by an improved process, preserving the original grain of the iron whole length; specimens of carriage and wagon hardware, pistol barrels, breech piece for breech loading double gun, gun hammers, gun triggers, splining rings, solid cast steel shears, clamp screws, thumb screws, drill chuck jaw, machine handle, machine bender screws, bolt and screw forgings, &c., and a variety of articles useful to gas fitters and machinists generally. In Annex No. 1, of Machinery Hall, the company have in operation the dead stroke power hammer, where its peculiar features can be examined, and the advantages claimed for it by the makers fully tested. It has been patented in this and several European countries, and we are informed was awarded a prize medal at the Paris Exposition. The special advantages claimed for this hammer, are as follows: "They can be run at high speed without breaking themselves to pieces. They have neither cylinders, valves nor piston rods, consequently repairs are trifling. They take up much less space, require much less power to drive, strike much harder and truer blows than either trip or tilt hammers of double the weight of ram. They can be worked to strike good alternate blows on a three-inch and three-eighths inch bar when a 100 lb. hammer is used. They can be used on die work to a far greater advantage than any other hammer known. They are sent complete and ready to work as soon as secured in foundation, and can be run with a belt, at almost any angle." The display is a very useful and practical one throughout, and deserves a careful examination by every one who visits Machinery Hall.

**THE AMERICAN MACHINE COMPANY.**  
In the Annex to the Main Building the American Machine Company have a very elegant display of fluting and wringing machines, which attract general attention from the trade and housekeepers generally. The Crown wringers and fluters were fully described in *The Iron Age* of July 27th, and we will, therefore, only refer to the Star fluting machine, which is said to be the latest and most novel improvement upon all the old styles of machine, having all the advantages of the latter, with special features of great practical convenience peculiar to itself. Foremost among these is the position of the rolls, which, in this machine, are entirely free from all surrounding obstructions, thus giving the operator the best opportunity of putting in and guiding the work with ease and regularity, and exposing it to full view immediately after it has passed through the rolls. It removes the objections heretofore urged against machines with overhanging rolls, as the lower roll in the "Star" is firmly supported in bearings at both ends, and the upper roll can readily be adjusted to the lower one in case of wear. The base of this machine has a clamp screw attached, by means of which it is fastened to the table. The arrangement of the pressure spring is such that the separating of the rolls does not compress it, thus not only saving the spring unnecessary strain, but easing the operation and saving the ruffle, which in other machines often becomes injured by the sudden clashing together of the rolls when released from the hold of the catch. The machine, in

every part, are of the best material and workmanship, finished in beautiful style, and present an elegant appearance. A pair of malleable iron tongs and a set of four wrought iron heaters is furnished with every machine. The rolls are made with 10, 12, 15, 18, 22, 26 and 30 flutes.

## The East River Bridge.

The first cable was stretched between the New York and Brooklyn towers of the East River Bridge on Monday. The work was begun at nine o'clock. The cable had been laid over the Brooklyn tower, and the large drum, on which was wound the wire, was on a scow. The steam tugs Ed. Annan and May Clinton were made fast to the scow, and at half past nine they were started across the river. The wire rope was slowly paid out, sinking to the bottom of the river, and within nine minutes was taken to the New York side. A large rope was then dropped from the tower and made fast to the cable, the other end being wound around the drum of a fifteen horse-power hoisting engine on the wharf. A cannon was fired as a signal for vessels not to cross the line during the raising of the cables. More than 5000 persons watched the raising of the cable. The lighter Comet was the first vessel that passed under the wire, and it was greeted vociferously. The stringing of the preliminary rope is the way by which all the wires that go to make up the great cable will be carried over the tower. Another rope was stretched across between the towers before the day's work was done. Both ropes were spliced together and were run from the drums at each anchorage, thus forming an endless rope. This rope will bear a strain of 14½ tons. Attached to it, at distances of about forty-five feet, there will be pulleys with hooks fastened beneath. The carrier rope is 1½ inches in diameter. Through the hooks a rope 1½ inches in diameter is to be carried. The end will be fastened to the working rope, and thus it will be dragged over the towers and across the river to the anchorage on the New York side, where it is to be made fast.

In all there will be ten temporary cables put up. Four of these are to be 3½ inches in diameter, and these are to support the cradles. There is to be a foot bridge forty-eight feet long and four wide, with a hand rail about four feet high, all made of stout oak, and bolted together. That will be called a cradle. At both ends there are to be two posts connected by pieces at the top which will support pulleys for the carrying of the wire for the great cables.

At 9:30 the bells of the tug sounded to start, the lashings were cast off, and the tug and scow slowly swung around. Mr. E. F. Farrington, the master mechanic, took charge of the stern of the boat, while Mr. G. W. McNulty, of the Engineer Corps, superintended the three men who unwound the rope. With a lever and a fulcrum on the top, a rope was secured on the rim of the drum, and in this way its action was kept under perfect control. The tide was running out, and as the boat pulled out into the river the current carried them down the stream. In the channel the water is about 65 feet deep. At the Brooklyn tower it is 17 feet, and at the New York tower it is about 35 feet. When two-thirds of the way across the boats were forced to come to a standstill, to allow the English bark August Leffer to pass up the river. At 9:38 the bulkhead of the New York tower was reached, and about 1470 feet of the cable had been paid out into the river. The next thing was to get the cable over the New York tower. A rope was passed from the hoisting engine in the yard over the tower, and it hung on the outer face at the lower end of the great pile of masonry. It was made fast to the wire cable. Mr. Farrington climbed to the top of the tower, and signalled "All ready; go ahead," and the hoisting engine was started. As the wire left the wharf, a cannon was fired. Within five minutes the end of the wire was at the top of the tower, and within five minutes more the slack of the cable had been hoisted in and reeled on the big drum in the yard. There was a long delay about the raising of the cable from the water, because of the many passing vessels. At 11:35 the gun was again fired, and several thousand persons on the piers and ships saw the cable rise from the water and link New York with Brooklyn. Later the ends were taken to the New York anchorage, and the last section was in position. There was great cheering, and many thousands a few minutes afterward wonderingly gazed upon the wires.

It may be of interest to our readers to know that the contract for all the steel work of the bridge is held by the Chrome Steel Company, of Brooklyn, and that the cables are made by the Roeblings, at Trenton, as sub-contractors, from Chrome steel.

Mr. Thomas Douglass, superintendent of the work has been ill for some time. He repeatedly said that he would contentedly die were he permitted to see the stretching across of the first wire. While Assistant Engineers Farrington and Martin were on the tower, and when the wire had been put in position, they received a telegram saying that Mr. Douglass had just died.

**Cement for Fixing Copper to Iron and Glass.**—A good cement for fixing copper to iron or glass is got by melting carpenter's glue in wine vinegar, adding a little Venice turpentine, and boiling up for half a day over a slow fire.

## Special Notices.

Office of POPE, WILLIAMS & CO.,  
CHATEAUGAY LAKE, N.Y. 1st, 1876.  
We have placed the exclusive sale of our  
**CHATEAUGAY STEEL IRON**  
in the hands of Messrs. Naylor & Co., 99 John St., New York; 208 South 4th St., Philadelphia; 6 Oliver St., Boston, who will hereafter act as our agents, and to whom all orders should be addressed.  
Yours truly, POPE, WILLIAMS & CO.

## Special Notices.

## Hardware at Auction.

**BISSELL, WELLES & MILLET,**  
Will hold at their Salesrooms,

No. 15 Murray Street, N. Y.,  
THEIR FIRST FALL

## TRADE SALE

Of Hardware, Cutlery, Guns, French  
Tinned Ware, &c., &c.

ON TUESDAY AND WEDNESDAY,  
the 29th and 30th of August,  
COMMENCING AT 10 1-2 O'CLOCK, A. M.

This sale will embrace about 1800 lots of desirable goods of the usual variety, suitable for city and country trade, consisting of Shelf and Heavy Hardware, 500 dozen Shovels and Spades, a large line of Cutlery, and a full assortment of French Tinned Ware. This is a very desirable way of replenishing stocks from first hands, and we cordially invite our friends to attend the sale.

**BISSELL, WELLES & MILLET,**  
Auctioneers,

15 Murray Street, N. Y.

## Notice to Manufacturers of Cast Iron Water Pipe.

Sealed proposals will be received at the office of the Board of Water Commissioners, No. 97 Washington Street, Hoboken, New Jersey, until 8 o'clock P. M., Thursday, August 31st, 1876, for furnishing the following Cast Iron Water Pipes: Two thousand and five hundred (2500) feet of sixteen (16) inch; five thousand (5000) feet of twelve (12) inch.

Five thousand (5000) feet of six (6) inch, and the necessary branches and bends. To be made of a good quality of iron, the pipes to be cast vertically, bell end down. Tested and inspected under a hydraulic pressure of three hundred (300) pounds to the square inch. To be free from defects of all descriptions.

To be coated with tar while hot inside and out. The pipes to weigh on an average as follows: The sixteen inch one hundred and twenty-five (125) pounds to the lineal foot.

The twelve inch seventy-five (75) pounds to the lineal foot, and the six inch thirty (30) pounds to the lineal foot.

Proposals to be sealed and indorsed. "Proposals for furnishing Cast Iron Water Pipe," and directed to the Board of Water Commissioners of the City of Hoboken.

The Board reserve the right to reject any or all bids if deemed for the interest of city so to do.

By order of the Board of Water Commissioners.

**M. H. MURPHY,**

Registrar.

## SECOND-HAND MACHINERY.

AT EXTREMELY LOW PRICES.

One 2000 lbs. Ferris & Miller Steam Hammer; one 1000 lbs. Ferris & Miller Steam Hammer; one Revere-Furnace, with Boiler attached, connected with 2000 lbs. Hammer. Eight small Heating Furnaces for anthracite coal. Twelve round open Hearth Forges (wrought iron). Eleven wrought iron Anvils, each weighing 200 lbs. and over. One Oliver with two Hammers. One Bennett 4-inch Bolt Cutter. Two 2-spindle Bolt Cutters, cuts ½ in. to 1½ in. One Die Dressing Machine. Two Double Nut Tapping Machines. One Rotary Nut Tapping Machine. One single-spindle clutch Bolt Cutter, cuts ½ in. to ¾ in. One Punching Machine, punches ¾ in. hole through 3-16 in. iron. One Punching Machine, punches 1 in. hole through 1 in. iron. One Punching Machine, punches ¾ in. hole through ¾ in. iron. One Plate Shears, receives blades 36 in. long, and will shear ¾ in. iron. One Alligator Shear, cuts to ¾ in. rod. Two Rotary Planers. One Channel Bar Drift. One 3-spindle adjustable. One Link Boring Machine, bed 48 ft. long, with 2 heads. One Hardway Bolt Heading Machine, heads ¾ in. to 1½ in. bolts. One Bolt Heading Machine, heads ¾ in. to 1½ in. bolts. One Rivet Heading Machine.

**GEORGE PLACE,**

121 Chambers & 103 Reade Streets, N. Y.

## NOTICE.

## Water Filters.

BATTERSEA, LONDON, July 1, 1876.

We beg to advise the trade and public that we have patented Mr. H. E. MEXNER'S 62 Water St., N. Y., sole agent for the sale of our well known SİLICATED CARBON WATER FILTERS.

**SİLICATED CARBON FILTER COMPANY.**

## SPECIAL NOTICE.

Having established ourselves in business in this city for the sale of

**AMERICAN HARDWARE, HOUSE-FURNISHING GOODS, AGRICULTURAL IMPLEMENTS, &c.,**

we beg to solicit correspondence with parties desirous of being represented by us in Germany and surrounding countries.

**HAMMACHER & DELIUS.**

HAMBURG, Germany, April, 1876.

House in N. Y., A. HAMMACHER & Co., 209 Bowery.

## SPECIAL NOTICE

A new style of

## MEN'S SINGLE GUNS,

in addition to the former line of A. Simon's, Liege, now offered.

**SILISIAN SHEET ZINC,**

Imported by

**LOUIS WINDEMULLER & ROELKER,**

20 Reade Street, N. Y.

## TO INVENTORS AND MANUFACTURERS

The 4th Exhibition of the American Institute will open September 4th. Machinery will be exhibited after August 14th, other goods after August 24th. Increased awards and a Special Gold Medal for this year. For particulars, blanks, etc., address "General Superintendent American Institute, New York."

Specialties of Wrought, Cast, or Sheet Iron or Brass.

Made to order in a SUPERIOR MANNER, AT LOW PRICES, by the

**CORRUGATED METAL CO., East Berlin, Conn.**

## DISCOUNT SCREW LIST.

Revised to date. . . . . 75c  
Wrought Hinges and Butts. . . . . 75c  
Cast Hinges and Butts. . . . . 75c  
Bolts. . . . . 75c  
Dayton & Lamberson, 97 Chambers St., N. Y.

## Special Notices.

## ROOFS.

Save time and money by sending for estimate for new or old buildings. Send for our 100 page Book (free if you write to-day), and learn how to stop leaks effectually and cheaply, save re-shingling, etc. Correspondence invited. 8 Cedar St., N. Y., or 49 S. Front St., Phila. Mention *The Iron Age*.

## JUST ISSUED.

**EVERYTHING** FOR THE **FARM.** Seeds, Implements, Machinery, and Fertilizers. New Catalogue, 200 Illustrations, mailed on receipt 10 cent stamp.

**A. B. COHU,**

197 WATER ST., N. Y.

## MANUFACTURING BY CONTRACT.

Our facilities are unusually extensive and complete for manufacturing small articles in

**Special Hardware, Tools & Machinery.** Are prepared to fill orders promptly and at low prices. Our reference is our work.

**THE HULL & BELDEN CO.,**

Danbury, Conn.

**WANTED.**—A first-class business man familiar with machinery and manufacturing, capable of handling large bodies of men, desiring a responsible position. References satisfactory. Address, **IRON AND STEEL,** Care of P. O. Box 813, Bridgeport, Conn.

## HALL &amp; HARBESON,

Manufacturers of

**Chemical & Physical Instruments,**

191 Greenwich Street, N. Y.

**SPECIALTY.**—BURNER'S GAS BURNERS, for all heating purposes; BURNER'S IMPROVED GAS CONSTRUCTION FURNACES, with 9, 15 and 25 burners. Fine Brass and Metal Work made to order for Metallurgists, Chemists, Experimenters, Colleges, &c.

## TO LET,

**A Light, Handsome Office.** Possession Immediately.

**HERMANN BOKER & CO.,**

101 Duane Street, N. Y.

## FOREMAN WANTED.

In the machine shop of an Agricultural Works, located in a flourishing Western city, building from two to three thousand reapers and mowers per year. Must be a thorough mechanic, active, systematic, careful and have a thorough knowledge of the business. Applications addressed to

**Western Agricultural Work**

Care of *The Iron Age*, 10 Warren St., N. Y.

panied with reference, will receive attention.

## NOTICE! POND'S TOOLS.

The undersigned has assumed the Personal Property, including accounts, finished and unfinished Machinery, good will &c., connected with the manufacture of Machinery's Tools as conducted by Mr. Lucius W. Pond since 1871, and will continue the said business at the old stand, cor. Union and Exchange Sts., Worcester, Mass., under the name of **DAVID W. POND, Successor to LUCIUS W. POND.**

Respectfully, **DAVID W. POND,**

Successor to LUCIUS W. POND.

## MANUFACTURERS

desirous of introducing their goods to the **British and Continental Markets**, are advised to insert advertisements in the newspaper "**IRON**," published every Saturday, at 99 Cannon Street, London, E. C.

SCALE: First 3 lines, 3s.; every additional line, 10d. Price, 6d. per Copy, or 30s. per annum, inclusive of postage to the United States.

## Steel Castings.

Solid and Homogeneous. Guaranteed tensile strength, 25 tons to square inch. An invaluable substitute for expensive forgings, or for Cast Iron requiring great strength. Send for circular and price list to

**CHESTER STEEL CASTINGS CO.,**

Ecclina St., Philadelphia, Pa.

**ATTENTION** is invited to the fact that the Labels used on my

Goods, were entered according to Act of Congress in the year 1876, in the U. S. Patent Office.

**IN ADDITION** to Auger Bits, I make a full line of **Extension Lip, Car, Machine, Dowel and Hand Rail Bits**, also of Boring Machine, Carpenters' and Millwrights' Angers. All my goods are solid **CAST STEEL**, and perfectly made by means of my Patent Machinery.

## SPECIAL NOTICE.

I have three patents for Dies, Machinery, and Tools for making Augers and Bits, each running seventeen years; dated as follows: Dec. 19, 1865; January 31, 1866, and July 3, 1866. There is a special claim on each of the Dies. All persons infringing on said patents will be held responsible to the extent of the law. **Russell Jennings.** DEER RIVER, Conn., Sept. 7, 1874.

## Wanted—A Partner,

In a foundry and machine business, already well established. Locality splendid and healthy.

A practical man with means is wanted to join a practical man who is already well established.

Address **CAR WHEEL FOUNDRY,**

P. O. Box 134, Selma, Alabama.

## Briesen's Patent Agency

FOR SECURING INVENTIONS, TRADE

MARKS, &c., IN AMERICA

AND EUROPE.

No. 258 Broadway, New York.

**A. V. BRIESEN.**

## VENTILATING &amp; STEAM HEATING.

A thoroughly competent engineer, with extensive experience in the above line, desires employment.

Address **M.,**

Office of *The Iron Age*, 10 Warren St., N. Y.

## Special Notices.

## A. PURVES &amp; SON,

Corner South & Penn Streets, Phila.,

Dealers in

Scrap Iron & Metals, Machinery, Tools, Shafting & Pulleys, Steam Engines, Pumps & Boilers, Copper, Brass, Tin, Rabbit Metals, Foundry Facings. Best Quality Ingot Brass. Cash paid for all kinds of Metals and Tools.

## EXPORT TO RUSSIA!

Having established ourselves in this city for the sale of **American Machinery, Hardware, Agricultural Implements and Technical Products** generally, we beg to solicit correspondence with manufacturers desirous of being represented in Russia. Familiar with the wants of the country, and as civil engineers, brought in contact with the industrial interests, we are enabled to introduce successfully American products to the trade.

Address **HARTOCH BROS.,**

Kasanka 46, St. Petersburg, Russia.

## PIG IRON and ORES.

**J. F. JAMES, Chattanooga, Tenn.**

Special attention given to orders from Southern Foundries. Advances made on consignments of Pig Metal and Warehouse receipts given upon arrival in store yard.

## DROP FORGINGS.

The TRENTON VISE & TOOL WORKS, Trenton, N. J., having increased their facilities, are now able to do all kinds of

**Iron and Steel Drop Forgings** in quantities to order at reasonable rates.

**HERMANN BOKER & CO., Proprietors,**

101 & 103 Duane St., N. Y.

## S. B. LOWE,

Chattanooga, Tenn.

Dealer in **METALS AND ORES.** Special rates of freight to all principal points in the United States and Canada.

## For Sale, &amp;c.

## RARE BUSINESS CHANCE.

The best Hardware and Paper Hanging stock in the city of Taunton. Business stand superior to any other, and rent low. Will be sold at a Bargain. Thorough chance for investigation given. Address, **Box 3465, Boston Post Office,** Or **A. W. BANGS & CO., Taunton, Mass.**

## For Sale.

## Hardware Business

In a city of 16,000 to 18,000 inhabitants, near New York, long established, and doing a stock business, surrounded by a fine agricultural district. Satisfactory reasons given for selling. Address, **"HARDWARE,"**

Office of *The Iron Age*, 10 Warren St., N. Y.

## FOR SALE OR TO RENT.

The valuable property known as the **BOONTON IRON WORKS**, situated at Boonton, Morris Co., New Jersey, now in complete working order. Also in connection with the same valuable mining properties, adjacent to the above, if desired. Apply to

**JNO. CROSBY BROWN,**

EDWARD C. LORD,

GEORGE B. FOSTER, LORD,

Executors of Estate of J. COUPER LORD.

## Stock of Hardware at Auction.

The Sheriff will sell at Public Auction, on August 25th, the entire stock of **E. A. WATROUS**, at Ogdensburg, N. Y. This sale will afford an excellent opportunity to anyone desirous of embarking in the business at this growing city, the stock being full and assortment complete. Particulars can be had by application to the Sheriff of St. Lawrence county. Sale positive.

## For Sale.

A General Hardware, House Furnishing, Plumbing, Gas Fitting, etc., store located in one of the most flourishing and rapidly growing towns within 50 miles of New York city. Only one other store of the kind in the place.

Address, **HARDWARE,**

P. O. Box 5712, New York City.

## For Sale!

Owing to the death of the senior partner, the surviving partner is desirous of disposing of that part of the business of the firm comprising the stove and Tin trade. Would dispose of the entire business, including Agricultural Implements, Hardware, Paints, Oils, &c., if desired. Terms easy with good security.

**L. PEASE & SON,**

Hartford, Vermont.

## For Sale.

Finest Hardware, Tin and Stove store in Northern Ohio. For the last nine months the owner having had poor health, has concluded to offer for sale his fine Hardware Business, which will inventory \$10,000 to \$12,000, or sell half interest to some live hardware man who can bring satisfactory reference.

**"JOHN,"**



# Trade Report.

Office of THE IRON AGE.  
WEDNESDAY EVENING, August 16, 1876.  
The past week has witnessed a noticeable improvement in the aspect of general trade, and in some of the principal markets a much better tone is reported. In the financial markets a more healthy tone is apparent. Money is very abundant and extremely cheap. Call loans, with government bonds as collateral, have been negotiated as low as 1/2 per cent, while the rate on stock collateral has been 1 1/4 per cent. The discount rate on prime mercantile paper has been 3 1/4 per cent.

The gold market has been very steady, and the fluctuations of the premium have been within very narrow limits. Everything is favorable to a low rate of premium, and speculation is based upon the assumption that it will still further decline. The following shows the extreme daily range of the premium since our last report:

|           | Highest. | Lowest. |
|-----------|----------|---------|
| Thursday  | 111 1/2  | 111 1/2 |
| Friday    | 111 1/2  | 111 1/2 |
| Saturday  | 111 1/2  | 111 1/2 |
| Monday    | 111 1/2  | 111 1/2 |
| Tuesday   | 111 1/2  | 111 1/2 |
| Wednesday | 111 1/2  | 111 1/2 |

Since last week the price of silver in London has advanced to 53 1/2 pence. This makes the value of the trade dollar 91 1/2 cts., gold, and of the subsidiary silver coinage 84 cts., gold. The adjournment of Congress without any action on the Bland silver bill is a great relief to the business community.

Government bonds have been strong but dull. The Secretary of the Treasury at noon on Saturday opened bids for the \$2,160,000 new five percent bonds, sold to obtain the means wherewith to discharge judgments of the Alabama Claims Commission. The total amount bid for was \$21,440,000, and the highest bid was that filed by Messrs. Fisk & Hatch—105 1/2, for the whole \$2,160,000; this price is equivalent to 117 1/2 in our market. We give below the closing quotations of governments. State bonds have been strong and steady; railway mortgages strong.

The stock market has been strong with higher prices, except for anthracite coal shares, which have been weak and feverish. The principal dealings have been in Lake Shore, Michigan Central, N. J. Central, Western Union, D. L. and W., St. Paul and Rock Island. The closing quotations of active shares are given below.

The following is a comparison of the bank averages for the past two weeks:

|             | Aug. 5.      | Aug. 12.     | Differences.   |
|-------------|--------------|--------------|----------------|
| Loans       | \$25,756,300 | \$25,756,300 | Inc. \$19,700  |
| Specie      | \$20,136,000 | \$21,092,000 | Inc. 956,000   |
| Legal tend. | \$60,333,300 | \$58,683,300 | Dec. 1,650,000 |
| Deposits    | \$26,479,800 | \$26,515,100 | Inc. 35,300    |
| Circulation | 18,007,600   |              |                |

The following tables show the movements in foreign trade for the week:

| IMPORTS. |       |       |       |
|----------|-------|-------|-------|
|          | 1874. | 1875. | 1876. |

|                |             |             |             |
|----------------|-------------|-------------|-------------|
| Total for week | \$5,252,836 | \$5,843,937 | \$5,760,715 |
| Prev. reported | \$5,393,436 | \$1,700,833 | \$1,793,922 |

Since Jan. 1.....\$258,646,363 \$220,544,770 \$185,514,617

Among the imports of general merchandise were articles valued as follows:

|                    | Quant.  | Value.  |
|--------------------|---------|---------|
| Brass goods        | 1,885   | 1,885   |
| Bronzes            | 17      | 3,556   |
| Chains and anchors | 11      | 284     |
| Copper             | 24      | 24      |
| Cutlery            | 33,384  | 5,339   |
| Gun                | 14      | 1,790   |
| Hardware           | 10      | 1,701   |
| Iron, pig, tons    | 1,471   | 41,178  |
| Iron cotton ties   | 162     | 893     |
| Iron, other, tons  | 80      | 5,339   |
| Iron ore, tons     | 1,212   | 2,404   |
| Lead, pigs         | 4,413   | 11,879  |
| Lead ashes         | 115     | 3,812   |
| Metal goods        | 20,190  | 162     |
| Needles            | 8       | 5,367   |
| Old metal          | 138     | 138     |
| Plateware          | 1       | 308     |
| Per. caps          | 80      | 3,908   |
| Saddlery           | 3       | 1,994   |
| Steel              | 12,109  | 12,109  |
| Spelter            | 110,300 | 5,610   |
| Tin, boxes         | 17,996  | 114,348 |
| Tin, 9648 slabs    | 246,440 | 44,605  |
| Wire               | 1,830   | 1,830   |
| Zinc               | 7,700   | 331     |

EXPORTS EXCLUSIVE OF SPECIE.

|  | 1874. | 1875. | 1876. |
|--|-------|-------|-------|
|--|-------|-------|-------|

|                |             |             |             |
|----------------|-------------|-------------|-------------|
| Total for week | \$5,496,733 | \$4,740,189 | \$4,519,311 |
| Prev. reported | \$5,114,273 | \$3,496,650 | \$3,089,851 |

Since Jan. 1.....\$186,611,106 \$153,235,789 \$164,609,192

EXPORTS OF SPECIE.

|  | 1874. | 1875. | 1876. |
|--|-------|-------|-------|
|--|-------|-------|-------|

|                     |             |           |           |
|---------------------|-------------|-----------|-----------|
| Total for week      | \$178,926   | \$178,926 | \$178,926 |
| Previously reported | \$2,669,975 |           |           |

Total since Jan. 1, 1876.....\$2,848,901

Same time in 1875.....\$1,875,570

Same time in 1874.....\$1,400,451

Same time in 1873.....\$2,964,763

Same time in 1872.....\$2,819,669

Government bonds at the close were firm, with quotations as follows:

|                           | Bid.    | Asked.  |
|---------------------------|---------|---------|
| U. S. Currency 6s.        | 126 1/2 | 126 1/2 |
| U. S. 6s 1881, reg.       | 119 1/2 | 119 1/2 |
| U. S. 6s 1881, cou.       | 120 1/2 | 120 1/2 |
| U. S. 5-30 1880, reg.     | 115 1/2 | 115 1/2 |
| U. S. 5-30 1880, cou.     | 115 1/2 | 115 1/2 |
| U. S. 5-30 1880, new reg. | 117 1/2 | 117 1/2 |
| U. S. 5-30 1880, cou.     | 117 1/2 | 117 1/2 |
| U. S. 5-30 1880, reg.     | 119 1/2 | 119 1/2 |
| U. S. 5-30 1880, cou.     | 121 1/2 | 121 1/2 |
| U. S. 5-30 1880, reg.     | 121 1/2 | 121 1/2 |
| U. S. 10-40 reg.          | 119 1/2 | 119 1/2 |
| U. S. 10-40 cou.          | 119 1/2 | 119 1/2 |
| U. S. 5s 1881, reg.       | 117 1/2 | 117 1/2 |
| U. S. 5s 1881, cou.       | 117 1/2 | 117 1/2 |

The closing quotations of active shares were as follows:

|                                   | Bid.    | Asked.  |
|-----------------------------------|---------|---------|
| Atlantic & Pacific R.R. Preferred | 3 1/2   | 3 1/2   |
| Atlantic & Pacific Telegraph      | 30      | 30      |
| Chicago & Northwestern            | 30      | 30      |
| Chicago, Rock Island and Pacific  | 107 1/2 | 107 1/2 |
| Chic. & Quincy                    | 107 1/2 | 107 1/2 |
| Col. & Ind. Cent.                 | 3 1/2   | 3 1/2   |
| Clev. Col. & Ind. & Indpls.       | 40 1/2  | 40 1/2  |
| Cleveland & Pittsburgh            | 90 1/2  | 90 1/2  |
| Cleveland & Alton                 | 102 1/2 | 102 1/2 |
| Chicago & Alton Preferred         | 108 1/2 | 108 1/2 |
| Consolidation Coal                | 40      | 40      |
| Canton                            | 30      | 30      |
| Del. Lack. & Western              | 95 1/2  | 95 1/2  |
| Delaware & Hudson Canal           | 91 1/2  | 91 1/2  |
| Adams Express                     | 112 1/2 | 112 1/2 |
| American Express                  | 60 1/2  | 60 1/2  |
| United States Express             | 66 1/2  | 66 1/2  |
| Wells, Fargo & Co. Express        | 94 1/2  | 94 1/2  |

|                            |         |         |
|----------------------------|---------|---------|
| Erie                       | 14 1/2  | 14 1/2  |
| Prof.                      | 22      | 22      |
| Harlem                     | 137 1/2 | 137 1/2 |
| Hannibal & St. Joseph      | 11 1/2  | 11 1/2  |
| Prof.                      | 20      | 20      |
| Illinois Central           | 88 1/2  | 88 1/2  |
| Kansas Pacific             | 5 1/2   | 5 1/2   |
| Kansas & Texas             | 8 1/2   | 8 1/2   |
| Lake Shore                 | 54 1/2  | 54 1/2  |
| Michigan Central           | 42 1/2  | 42 1/2  |
| Morris & Essex             | 96 1/2  | 96 1/2  |
| Milwaukee & St. Paul       | 37 1/2  | 37 1/2  |
| Prof.                      | 70 1/2  | 70 1/2  |
| Mariposa                   | 7 1/2   | 7 1/2   |
| Prof.                      | 8       | 8       |
| New York Central           | 106 1/2 | 106 1/2 |
| New Jersey Central         | 62 1/2  | 62 1/2  |
| New Jersey Southern        | 6 1/2   | 6 1/2   |
| Ohio & Mississippi         | 13 1/2  | 13 1/2  |
| Pacific Mail               | 24 1/2  | 24 1/2  |
| Panama                     | 127 1/2 | 127 1/2 |
| Pittsburgh & Fort Wayne    | 103 1/2 | 103 1/2 |
| Pacific of Missouri        | 10 1/2  | 10 1/2  |
| Quicksilver                | 11 1/2  | 11 1/2  |
| Prof.                      | 14      | 14      |
| St. L., Kan. City Northern | 6 1/2   | 6 1/2   |
| Prof.                      | 30 1/2  | 30 1/2  |
| Tol., Wash. & Western      | 1 1/2   | 1 1/2   |
| Union Pacific              | 64 1/2  | 64 1/2  |
| Western Union Telegraph    | 72 1/2  | 72 1/2  |

## GENERAL HARDWARE.

The improved condition of the trade, noticed last week is of a more confirmed and general character. From the South many buyers have arrived, and we hear of fair orders being placed. Sargent & Co. and the Russell & Erwin Mfg. Co. have issued their discount sheets. The changes contained in these have nearly all been noticed in our price current as they occurred, and nothing of a radical nature has been developed. We hear of other discount sheets in the printer's hands, which will be issued during the current week.

The Russell & Erwin Manufacturing Co. have issued the following circular, showing a slight advance in their price for Flat Head Wood Screws. They inform us that they are rapidly extending this branch of their manufacturing business, and are at present turning out 4000 gross of Wood Screws daily:

Circular Number 4.

SCREWS.  
We hereby annul our circular on Screws, dated August 1st, 1876. All orders and unfilled balances are cancelled in accordance therewith. Until further notice, we solicit orders for Flat Head Iron Screws upon the following terms: Discount fifty and twelve and one-half percent. on our list, cash 30 days. No prices guaranteed. All balances and unfilled orders received in excess of our ability to execute from our daily production, will be cancelled without notice. RUSSELL & ERWIN MFG. CO., New York, August 15th, 1876.

The demand for Foreign Hardware is better than it has been in a long time, and some of our importing houses are fairly active. Prices are unchanged and firm.

The demand for Nails shows little if any improvement, and prices are unchanged. We quote as before, 10d. to 60d., \$3-10 per keg, with a discount of 10 cents per keg in large lots. Hermann Boker & Co., Nos. 101 and 103 Duane street, have issued the following circular and appendix to their catalogue and price list of 1874. The regular discount from the entire line of Picks, Mattocks, &c., is 25 per cent. The new Model Improved Swivel Vises are subject to discount 20 per cent. from the accompanying list:

NEW YORK, AUG. 10, 1876.

DEAR SIR: We beg to inclose illustrated list of our new Solid or Adze Eye Picks and Mattocks (and for which an application for a patent is now pending), as appendix to our general price list of 1874.

As to the quality, finish, etc., of these goods, you can be assured that we have left nothing undone to make these the standard and leading goods of this country.

We claim them to be superior to any in the market; also, that they are one-third stronger than the old Washoe. Great protection to the handle is obtained by the raised or elongated eye, which not only gives additional strength to the handle, but prevents any loosening or shifting, as is the case in the old style eye.

In the manufacture of these Picks and Mattocks we have gone on the principle that good material makes good goods. We also insert our steel—do not lay it on—as done by other manufacturers.

In making up your orders for these goods, we trust you will favor us with a portion of the same, which will receive our prompt attention. We remain, dear sir,

Yours, very truly,  
HERMANN BOKER & CO., Proprietors,  
Trenton Vise and Tool Works, Trenton, N. J.

PATENT SOLID EYE PICKS.

Railroad Picks.

|                   |       |
|-------------------|-------|
| No. 0, 4 lbs.     | 14-00 |
| No. 1, 4 1/2 lbs. | 14-50 |
| No. 2, 5 lbs.     | 15-00 |
| No. 3, 5 1/2 lbs. | 16-00 |
| No. 4, 6 lbs.     | 16-00 |
| No. 5, 6 1/2 lbs. | 17-00 |
| No. 6, 7 lbs.     | 18-00 |
| No. 7, 8 lbs.     | 19-00 |

We claim these Picks to be the best and strongest in the market.

None genuine except those stamped with our patented trade-mark.

Railroad Tamping Picks.

|                |                  |
|----------------|------------------|
| No. 17, 7 lbs. | Per doz. \$20-00 |
| No. 17, 8 lbs. | 22-00            |

Patent Solid Eye Drifting or Miners' Picks.

|          |         |       |       |       |       |
|----------|---------|-------|-------|-------|-------|
| Lbs.     | 3       | 4     | 4 1/2 | 5     | 6     |
| No.      | 1       | 2     | 3     | 4     | 5     |
| Per doz. | \$13-00 | 14-00 | 14-50 | 15-00 | 16-00 |

Coal Picks.

|          |         |       |       |       |       |
|----------|---------|-------|-------|-------|-------|
| Lbs.     | 3 1/2   | 4     | 4 1/2 | 5     | 6     |
| No.      | 1       | 2     | 3     | 4     | 5     |
| Per doz. | \$12-00 | 13-00 | 14-00 | 15-00 | 16-00 |

Coal Poll Picks.

|          |         |       |       |       |       |
|----------|---------|-------|-------|-------|-------|
| Lbs.     | 3 1/2   | 4     | 4 1/2 | 5     | 6     |
| No.      | 1       | 2     | 3     | 4     | 5     |
| Per doz. | \$13-00 | 14-00 | 14-50 | 15-00 | 16-00 |

Patent Solid Eye California Surface Mining Pick—“Curved.”

|          |         |       |       |       |       |
|----------|---------|-------|-------|-------|-------|
| Lbs.     | 3       | 3 1/2 | 4     | 4 1/2 | 5     |
| No.      | 1       | 2     | 3     | 4     | 5     |
| Per doz. | \$15-00 | 15-50 | 16-00 | 17-00 | 18-00 |

Long Cutter.

|               |         |
|---------------|---------|
| Per doz.      | \$23-50 |
| Short Cutter. | 23-00   |
| Pick Mattock. | 23-00   |

We claim that our patent Solid or Adze Eye Picks and Mattocks are the best in the market.

New Model Improved Swivel Vise.—No. 5.

|          |         |       |       |            |
|----------|---------|-------|-------|------------|
| Lbs.     | 2 1/2   | 3     | 3 1/2 | 4 in. Jaw. |
| No.      | 1       | 2     | 3     | 4          |
| Per doz. | \$35-00 | 40-00 | 45-00 | \$50 each. |

New Model Improved Parallel Vise.—No. 6.

|          |         |       |       |            |
|----------|---------|-------|-------|------------|
| Lbs.     | 2 1/2   | 3     | 3 1/2 | 4 in. Jaw. |
| No.      | 1       | 2     | 3     | 4          |
| Per doz. | \$30-00 | 40-00 | 45-00 | \$50 each. |

der date of 1st instant. The prices quoted are the figures at which these goods are held in this city.

CIRCULAR AND PRICE LIST, NO. 4.

Office of the

RHODE ISLAND HORSESHOE CO.,

PROVIDENCE, R. I., Aug. 1, 1876.

TO THE TRADE.—We take great pleasure in again offering you the several brands of Horse and Mule Shoes manufactured by us. The rapidly increasing demand from all sections of the country for these goods is a sufficient guarantee of the many superior qualities they possess. Thanking you for your patronage in the past, we hope, by strict attention both to the details of manufacture and to the wants of the trade, to merit a continuance of your favors. We are prepared to receive orders for our Horse and Mule Shoes upon the following prices and terms:

|   |               |
|---|---------------|
| The Perkins New Light Pattern Horsehoe                  | 4-63 1/2 cts. |
| The Perkins New Medium Pattern Horsehoe                 | 4-63 1/2 cts. |
| The Perkins New Heavy Pattern Horsehoe                  | 4-63 1/2 cts. |
| Perkins' Snow or Trotting Shoes                         | 5-63 1/2 cts. |
| Perkins' Mule Shoes                                     | 5-63 1/2 cts. |
| Free on board cars, at the Works at Valley Falls, R. I. |               |

A specification of sizes will be required when orders are accepted. Shipments will be promptly made in their turn. Terms of payment, cash in 30 days from date of invoice. If unpaid, subject to sight draft, with notice. We reserve the right to decline orders, also to advance prices at any time except upon contracts made prior to such advance. Strikes of operatives, or suspension in case of fire, will relieve us from prompt fulfillment of contracts. Shoes assorted as required.

Messrs. Horace Durrie & Co., 97 Chambers and 81 Reade streets, New York, will continue to act as our agents, and they are authorized to sell at all times at our lowest factory prices. A full assortment of our Shoes we purpose to keep in their store, ready for immediate delivery.

We call special attention to our new improved Horsehoes, of which we manufacture three brands, viz., “The Perkins New Light Pattern,” “The Perkins New Medium Pattern,” “The Perkins New Heavy Pattern.”

The Light Pattern is designed for country and light shoeing; the Medium for ordinary city work, and the Heavy for heavy work and extra heavy wear. The same size of either brand will fit the same horse, the difference being in width of web, thickness and weight, the outside measurement being the same.

In these Shoes we have combined all the good qualities of our Rhode Island and Perkins patterns, so well and favorably known throughout the country. We have rearranged the sizes, making them finer, or with less difference in size, than before, and have given them a new and improved pattern, viz., Front and Hind, and 3 Front, and have made such other changes in the web, length and thickness, as we judged would best meet the wants of the horsehoes of every section of the country.

In improving our Shoes we have given them extra strength at those points where all Shoes are most liable to break. The heels are thickened by sledge-like blows, hardening the iron at that point, and the whole wearing surface is more thoroughly hammered in, and of such form as to leave ample strength at the toe and a good level foot bearing. The crease or fuller is of the right shape to allow the nail head to sink in to the proper depth and to wedge firmly, and to prevent bulging when the holes are pritchetted out. The holes are punched through at regular distances apart, and from the edge, also at a proper angle to give the nails the right slant. The turns are cleaned off, the iron left of its natural color and free from oil. We leave the outside edge rounding, which enables the shoe, with but little additional labor, to obtain the form so necessary to prevent interfering. The selected stock from which all our Shoes are made is of the same quality as the best American Shoe shapes.

Our Shoes are made by a process as near that employed by the blacksmith in turning Shoes by hand as it is possible for machine work to imitate the work of the hand. The hammering is done by a succession of light, drawing blows, similar to the strokes of the hand hammer, instead of by pressure or by rolls.

The Shoes will be found ready fitted for plain shoeing, without calks. We ask your inspection of them, feeling confident that after a fair trial you will find that they run more even in shape, the sizes are in better proportion, that they will fit up better, drive easier, and prove to be for you the cheapest and best Horsehoes in the market.

In addition to the above mentioned brands of Horsehoes, we make a full line of Mule Shoes, from No. 1 to 6, inclusive; also, a full line of Perkins' Snow Shoes, from No. 0 to 5, inclusive, both front and hind. The latter is a light concave shoe, which for a Winter or Snow Shoe is unequalled. They have been extensively used for light shoeing, upon trotting and driving horses, and have given the best satisfaction. The steadily increasing demand for these shoes during the past seven years is the best evidence we can offer of the favor with which they have been received.

RHODE ISLAND HORSESHOE CO.,

F. W. CARPENTER, President.

Lane & Gale, Troy, N. Y., have issued the following quotations for goods of their own manufacture and the special lines for which they are agents:

The Johnsonville Axe Manufacturing Co.'s Chopping Axes, Hatchets and Tools.

Hurd's "Razor Blade" C. S. Axes.

Ex. Light. Light. Medium. Heavy. Ex. Heavy.

Reveled. 10-00 10-50 11-00 11-50

Silver Steel.....\$1 per doz. extra.

Steel Post.....\$1 per doz. extra.

Double Bit.....\$17-50 Medium. Heavy.

Spanish.....De Tumb. Media Labor. Labor Extra.

Blair's "Victor" C. S. Axes, 50c. per doz. less than Hurd's.

H. T. Miller's C. S. Axes, second quality, 1 1/2 per doz. less than Hurd's.

Hurd's C. S. Axes and Broad Axes, dis. 25 & 35.

"Boys' Axes and Hatchets.....30 & 35.

"Hatchets, Hunters'.....30 & 35.

"and Half.....Shingling, Lathing, Claw.

H. T. Miller's C. S. Hatchets and Tools.....40 & 45.

Lane's "Crescent" Planter's Hoes.

G. T. Lane's Cast Steel "Crescent" Planter's Hoes, Lane's Pattern.....dis. 15.

G. T. Lane's Planter's Hoes, Scovill Pattern.....dis. 10.

The Eagle Square Manufacturing Co.'s Squares and Boring Machines.

Steel and Iron Squares, full Cases.....dis. 55.

For Broken Cases.....dis. 50.

Nickel-Plated, See List in

Catalogue.

Parties who become entitled to the full discount on Steel Squares will be allowed 5 percent. discount on our prices for Nickel Plating.

Boring Machines, No. 5 Straight without A-borers.....\$3-50 net.

Boring Machines, No. 2 Angular without A-borers.....\$4-50 net.

Boring Machine Augers in sets, 18 qrs.....List \$3-50, dis. 40.

Scov



Locks, Latches and Lock and Latch Furniture is very complete, and occupies more than half of the volume. The engravings are particularly fine, the typography and press work excellent, and the book, as a whole, is highly creditable to Messrs. P. & F. Corbin. It is accompanied by a convenient price book of 42 pages, containing a condensed list of miscellaneous goods arranged numerically, Lock Lists, &c.; also their discount sheet, issued under date of July 1, 1876.

We again call attention to the advertisement on the 16th page of a sale of Hardware at auction, by the sheriff of St. Lawrence county, to be held at Ogdensburg, N. Y., on the 25th instant, not the 23d, as stated in our last issue.

We have received the following amusing letter from "Manufacturer," and find it difficult, on such short notice, to answer his question, "What are you going to do about it?" Perhaps we have suffered as described in the letter, but if we have we have been mercifully kept in ignorance of it. It is true we knew of the ban placed upon our manufacturers in the matter of published prices, but it has never occurred to us that the readers of *The Iron Age* have suffered thereby; on the contrary, our trade information has lately been fuller, more comprehensive and more satisfactory to our subscribers than ever. If the terrible catastrophe predicted by "Manufacturer" should overtake us, we are not yet too old to "go West."

To the Editor of *The Iron Age*: Important, if true, is the prediction of a well-known Cincinnati, Ohio, hardware jobber, and prominent member of the Western Hardware Association, who says that "within five years the Eastern manufacturers of Hardware, and the Eastern Hardware jobbers' occupation will be gone, and be superseded in the West by home manufacturers and Western jobbers."

In recent conversation this Western man declared the policy of himself and associates, and said: "We will in every way encourage the Western manufacturer, who will in turn protect us as vendors, and the Eastern manufacturer and the Eastern vendor may go to the devil."

This disposition to protect home industry is commendable. The determination to transfer—in so short a time—so large a business, is simply wonderful, and the Eastern losses thereby in real and personal property, is a dreadful thing to contemplate. The late sufferings in Bulgaria, where whole villages were burned, and the inhabitants butchered in cold blood by a lawless people, is nothing to be compared with it. Here it is proposed to take away the means by which whole communities live, and leave them to die a lingering death by starvation.

In common mercy the Western jobbers should give us a little more time to wind up our business affairs, and "go to the devil" in decent order.

It Western mechanics have half the genius of the members of the Western Hardware Association they will be able to defy all competition. See how skillfully they have bamboozled their Eastern nurses. By continually crying for pay, (i. e. credit, special allowances and protection by non-publication of current prices, &c.), they have got strong and fat, and now these well-nursed and well-fed people propose to show their manly strength, and kick their nurses "to the devil."

Mr. Editor, in the language of the invisible Tweed, I ask, "What are you going to do about it?" You are a party interested; you stand in the line of this fearful storm, and may be blown to pieces. You have already suffered by the Western Association's edict forbidding the Eastern manufacturers to publish in your columns their current prices under penalty of non-patronage, &c. Now, as we must drop out one by one, our advertisements will be withdrawn, and your paper will be of no use to our subscribers.

As our interests seem to be identical, suppose we make up a two and sixpenny purse, and fight this thing on joint account. I don't like the idea of giving it up so. I have no other means of living, and I am too old a young man to "go West."

Down East, Aug. 16, 1876.

#### BRITISH IRON MARKET.

(Specially reported by cable for *The Iron Age*.)

WEDNESDAY, Aug. 16, 1876.

**Scotch Pig.**—The market is quiet, with some transactions, but it is impossible to quote prices, which are purely nominal and irregular.

**Manufactured Iron and Rails** continue unchanged.

#### IRON.

**American Pig.**—The demand for Iron of every description is still confined to the small parcels needed for actual present requirements. Sales are reported during the week of 600 tons No. 1 and 2 X at \$20 @ \$22, both Thomas Irons, and 100 tons No. 1 Allentown at \$22. It is generally believed that the Crane Iron Company are about to blow out their three remaining furnaces. This will leave but 10 furnaces in blast in the Lehigh Valley, exclusive of the Bethlehem's stacks, which make none for sale. All the Hudson furnaces are idle, and we believe there is but one of the Poughkeepsie in blast at present. This unparalleled curtailment of production has no effect in stimulating consumers to anticipate their wants, and with the exception of some brands of Forge Irons we hear of no scarcity. We quote on a firm market: No. 1 Foundry, \$22; No. 2 Foundry, \$20; Gray Forge, \$19 @ \$20.

**Scotch Pig.**—The sales and arrivals during the week are unimportant. We continue to quote on a very dull market: Coltness, \$20; Glengarnock, \$20 @ \$22; and Eglington, \$27.

**Rails.**—We quote as before: Iron, \$39 @ \$42, at mill.

**Old Rails.**—In the absence of transactions we quote as before, \$21-50 @ \$22. We note the sale of 100 tons Old Car Wheels at \$30.

**Scrap.**—Sales are reported of 300 tons Wrought and 350 tons Cast Scrap, both on private terms. We quote: Wrought Scrap, from yard, \$29.

#### METALS.

**Copper.**—The Copper market has remained in the same unsatisfactory condition hitherto reported, sales of Lake Superior during the week not exceeding 250,000 pounds, from 19½¢ down to 19¼¢. We quote the market quiet at

the close at 19½¢ @ 19¼¢, and Baltimore nominally 19½¢. Of the latter description 150,000 pounds are reported sold at Baltimore at 19½¢. Copper has now declined to as low a point as it dropped to two years ago, subsequent to the corner. Then a good many consumers and dealers came forward and bought, and prices quickly rebounded. The general dullness in business, and in the metal trade in particular, has thus far discouraged a similar movement, but it may, nevertheless, yet take place any day, and it will be advisable to watch the metal very closely from now forward. While this uncertainty about the immediate future prevails on this side, people seem to be as much at a loss what to think of it in Europe. Thus Chili Bars, as per cable, have receded to the lowest point, \$70; Best Selected, on the other hand, commands \$77. Mail accounts have been received from London as late as Aug. 5, reading as follows: "Chili Bars have declined to \$71. 10/11, and unless fresh action is taken by speculators for the rise, it seems not unlikely that prices may continue to droop still further. The Indian exchange having recovered the recent relapse, there is, however, a fair prospect of orders coming forward for manufacture. From Bombay the accounts are already slightly better. Leaving aside the 1355 tons aloft from Australia, advised by mail, and the 3600 tons aloft and chartered, advised by cable from Chili, the visible supply in England and France is now 31,803 tons, against 29,704, 32,691, 39,279 and 37,733 in 1875 to 1872, while the price is \$72, against \$70, \$76, \$81 and \$103." While the statistical position differed little from that of the preceding two years, prices, it will be observed, had declined most materially. Under these circumstances Copper in Europe should rather inspire confidence than otherwise. Manufactured remains quiescent at 31c. for Sheathing, and 32c. for Bolts and Braziers; Bronze and Yellow Metal Sheathing, 20½¢ @ 21c.; and Yellow Metal Bolts, 26c. @ 28c.

**Tin.**—London has kept steady, the latest cable dispatch still quoting Straits, \$72. 10/11. The recent rise in silver has caused the exchange at Singapore to recover correspondingly, and, at the quotations out there, Tin cannot be laid down here for less than 18c., gold, which has not prevented us from declining to 16½¢, gold. These continual fluctuations in exchange are, of course, a hindrance to the even flow of business between Singapore, New York and Boston, and will contribute to keep the supply there within narrow bounds. Nor should it be overlooked that politically the Malay Peninsula is officially admitted still to be somewhat unsettled, and we are, consequently, led to the conclusion that the outflow of Tin is not on such a liberal scale as was the case a year ago. This, combined with the long drought in Australia, may have the effect of diminishing arrivals from the extreme East at London for sometime to come. The statistical position in England and Holland, nevertheless, still remained a highly unfavorable one, the visible supply, 1st instant, being 13,891 tons, against 13,761 the previous month, and 14,273 and 11,056 tons the preceding two years. The July deliveries had been 1537 tons, against 2481 in June. Straits was worth \$73. 10/11, against \$75 a month previous, and \$76. 10/11 and \$94 the preceding two years. We have remained remarkably quiet here, and quote large lines in gold, as follows: Straits, 16½¢; English Refined, 17c., nominally; ditto, Common, 16½¢ @ 16¼¢, and Banca, 20½¢. The price of Common at London of \$78 is equal to 16½¢, gold, here, including a commission; \$77 is equal to 16½¢, gold. The Tin Plate demand has been an extremely quiet one. We quote at the close in large lines, gold, per box, ordinary brands: Charcoal Bright, \$7-25 @ \$7-37½; ditto Terres, \$6-62½ @ \$6-87½; Coke Tin, \$6-25 @ \$6-37½, and ditto Terres, \$5-75. England remains quite firm; recent letters from there take a strong view of the market. It would seem that interested parties over there do all in their power to impede a further advance.

**Lead.**—The position of this article here is essentially unaltered, but good hopes are entertained as regards the demand for Shot, usually setting in about this time of the year. The consumption of Shot, it would appear, has been rather on the increase during the past three years, the bad times having driven many out of employ to resort to hunting for a living. Sales of the week have been but trifling. We quote: Common Domestic Lead, 7c. @ 7½¢, currency, as to quantity; and Soft Miscellaneous, in larger lots, 7-10c., currency. Some Selected is supposed to have sold a trifle below current rates, say at 7-20c., currency, the ruling price being 7-25c., currency. The improvement which we alluded to a fortnight ago as having taken place in Europe, then reported by cable, is confirmed by the mail accounts of August 5, received to-day, the recovery in England having been 15/11, in consequence of an abatement in exports of Lead from Spain. The purchases for French and Russian government account, which we announced at the time, have no doubt helped this upward turn. At all events, Common Foreign is now worth 6½¢ @ 6¼¢, gold, here. Manufactured continues well supported at 8½¢ for Bar; 9½¢ for Pipe, and 10c. for Sheet, less the usual discount to the trade.

**Spelter and Zinc.**—The Spelter supply of Europe is running low again, causing great firmness on the part of holders. At Breslau, in Silesia, 21-50 marks had been offered in vain for Common, 21-75 being insisted upon. Hamburg also remained quite firm. Here trade in Domestic Spelter still flags, although there has been more looking round. Stocks in the hands of producers are now reported to be but moderate, and some of them are averse to engaging much ahead, and would not sell below 7½¢, currency, here, delivery in September next. The current quotation for Domestic Spelter on the spot is at present 7½¢, currency. Foreign is inac-

tive at 7c. @ 7½¢, gold, according to size of lot, without anything doing either on the spot or to arrive. **Sheet Zinc.**—The market is moderately active but steady at 8½¢ @ 8¼¢, gold, for Mosselmann, and 9c. @ 9½¢, currency, for American.

**Antimony** is quoted \$62 @ \$63 at London. Business in this metal is quiet here, and we cannot quote the same over 15½¢ @ 15¼¢, gold, according to the quantity that may be wanted.

#### OLD METALS, PAPER STOCK, &c.

The sales of Old Metals have been very light the past week, and dealers find it an impossibility to dispose of any considerable quantity. There is a better feeling, however, in connection with Lead, and quotations are more easily obtained. The Rag and Paper Stock markets still continue unchanged from the dullness previously noted. There is little demand for any description of stocks, and prices remain nominally unchanged. We quote the following as the current purchasing rates:

**Old Metals.**—Copper, 15c. @ 16c. per lb.; Yellow Metal, 10c.; Brass, 9c.; Composition, heavy, 10c. @ 11c.; Lead, solid, 5½¢; Tea Lead, 5c.; Zinc, 4c.; Pewter, No. 1, 13c.; do, No. 2, 8c. @ 10c.; Spelter, 5½¢. Wrought Iron, \$21 per ton; Light do, \$12 per ton; Stove Plate, \$8 per ton; Machinery, do., \$10 per ton; Burnt Iron, \$6 per ton.

**Rags, &c.**—Canvas, Linen, 4½¢ @ 5½¢; do. Cotton, No. 1, 5½¢; No. 2, 2½¢; White, No. 1, 5c.; No. 2, 4c.; Colored, do., 2c.; Mixed, Woolen, 2c. @ 3c.; Soft, do., 5c.; Gunny Bagging, 1½¢; Jute Butts, 1½¢ @ 2c.; Kentucky Bagging, 8c.; Book Stock, 3c.; Newspaper Stock, 2½¢; Waste Paper and Scraps, 1½¢; Kentucky Bale Rope, 4c.; Oakum Junk, No. 1, 4½¢ @ 5c.; do. No. 2, 3c.; Tarred Shaking, 1c. @ 1½¢; Grass Rope, 2½¢ @ 3c.

#### IMPORTATIONS.

Of Hardware, Iron, Steel and Metals into the Port of New York, for the week ending August 15, 1876:

| Hardware.              | Order.                |
|------------------------|-----------------------|
| Brown, Shipley & Co.   | Bars, 6935            |
| Gun barrels, es, 1     |                       |
| Baker Hermann & Co.    |                       |
| Misc. pkgs., 27        |                       |
| Blumenthal I. & A.     |                       |
| Cases, 1               |                       |
| Byrne Wm. & Co.        | Brown Wm.             |
| Cutlery, es, 1         | Bundles, 119          |
| Folsom H. & D.         | Cases, 19             |
| Misc. pkgs., 9         | Prosper Thos. & Sons, |
| Field Alfred & Co.     | Misc. pkgs., 1        |
| Chains, es, 3          | Sulzbacher, Hyman,    |
| Cases, 2               | Wolf & Co.            |
| Cases, 10              | Bars, 256             |
| Hogsdon, 2             | Woodford W. O.        |
| Anvils, 59             | Cases, 13             |
| Guenther Geo. & Son,   | Walscheid C. A.       |
| Misc. pkgs., 7         | Bars, 190             |
| Herrmann Bros.         | Order.                |
| Cartridge cases, es, 9 | Cases, 2              |
| 9                      | Tires, 14             |
| Haigh J. Lloyd.        |                       |
| Wire rods, bbls., 185  |                       |
| Moller & Co.           |                       |
| Tools, es, 1           |                       |
| Montgomery J. M.       |                       |
| Cases, 1               |                       |
| Mason John W. & Co.    |                       |
| Ware rope, coils, 12   |                       |
| Schroeder & Daly,      |                       |
| Arms, es, 5            |                       |
| Spies, Klemm & Co.     |                       |
| Scrap, pkgs., 4        |                       |
| Van Wart & McCoy,      |                       |
| Misc. pkgs., 11        |                       |
| Wiebusch & Hieger Hwd. |                       |
| Co.                    |                       |
| Whiststones, es, 35    |                       |
| Misc. pkgs., 3         |                       |
| Anvils, 250            |                       |
| Ward Asline,           |                       |
| Misc. pkgs., 7         |                       |
| Ironware, pkgs., 6991  |                       |
| Guns, es, 3            |                       |
|                        |                       |
| <b>Iron.</b>           |                       |
| Henderson Bros.        |                       |
| Pig, tons, 100         |                       |
| Mott J. L.             |                       |
| Cases, 5               |                       |
| Marvel Wm. D.          |                       |
| Ord. tons, 600         |                       |
| Naylor & Co.           |                       |
| Spiegel, tons, 75½     |                       |
| Prosper Thos. & Sons,  |                       |
| Tubes, bbls., 21       |                       |
| Robbins C. H.          |                       |
| Hoop, bbls., 1061      |                       |
| Scrap, es, 10          |                       |
| Order.                 |                       |
| Spiegel, lots, 1       |                       |

#### COAL.

The meeting of the combination, which took place since our last, resulted in the adjustment of the little difficulty in regard to cutting prices in the Eastern markets. It is to be settled so that there is no more of it to be done, and rumor says that everything is satisfactory, and harmony prevails. All this, however, does not seem to help the regular trade, which is as dull as ever. Outside Coals are in good demand, apparently, and the prices are considerably firmer, with a fair inquiry for Coal. We fancy that there is not as much harmony of feeling in the minds of the managers of the Coal combination as is generally supposed. While the outside is all apparently smooth there are a great many things which must be unpleasant for some members of the combination. There has been, on this account, a renewal of the gossip in regard to the breaking up of the combination. This we think ill; we do not see the least probability of a break-up this season. It is true that the companies can do nothing, being virtually out of the market even now with the increased demand, yet it is certain that but few of the great companies could stand without embarrassment the loss which would follow the ending of the combination just now. Eastern markets would reap no advantage from the crash in prices which would follow, as freights would probably advance to such a point as to more than make up for the break.

We quote as follows:

Cumberland, at Georgetown, \$3-50 @ \$3-75

West Virginia, at Baltimore, 4-50 @ 6-00

Kittanning f. o. b., Baltimore, 4-25 @ 4-35

Newburg Orrel, at " 4-50

Despard, at Baltimore, 4-50

Broad Top, at South Amboy, 4-75

Morrisdale, Wiggins, 4-75

Canard, at " 4-75

" at Philadelphia, 4-75

Consolidation Coal Co. f. o. b., Georgetown, 4-75

Consolidation Coal Co. f. o. b., Baltimore, 4-75

In barges at New York, 4-75

Maryland Coal Co. f. o. b., Baltimore, 4-75

Maryland Coal Co. f. o. b., Georgetown, 4-75

#### PRICES FOR AUGUST.

|   | Lump. | Stove. | Broken. | Egg. | Stove. | Chestnut. |
|---|-------|--------|---------|------|--------|-----------|
| PENNSYLVANIA COAL CO., at Weehawken, N. J.                                  |       |        |         |      |        |           |
| Pittston  | 4-90  | 5-00   | 5-10    | 5-20 | 5-30   | 5-10      |
| DELAWARE AND HUDSON CANAL CO., at Weehawken, N. J.                          |       |        |         |      |        |           |
| Lackawanna  | 4-90  | 5-00   | 5-10    | 5-20 | 5-30   | 5-10      |
| LEHIGH AND WILKES-BARRE COAL CO., f. o. b. at Port Johnson, N. J.           |       |        |         |      |        |           |
| Old Company's Summit  | 5-40  | 5-20   | 5-30    | 5-10 | 5-20   | 5-30      |
| Honey-Brook Lehigh  | 5-40  | 5-20   | 5-30    | 5-10 | 5-20   | 5-30      |
| Wilkes-Barre  | 4-10  | 5-00   | 5-10    | 5-20 | 5-30   | 5-10      |
| Plymouth Red Ash  | 5-10  | 5-20   | 5-30    | 5-10 | 5-20   | 5-30      |
| PHILADELPHIA AND READING COAL AND IRON CO., at Port Richmond, Philadelphia. |       |        |         |      |        |           |
| Hard White Ash Coal   | 4-55  | 4-65   | 4-75    | 4-85 | 4-95   | 4-65      |
| Free Burning White Ash  | 4-55  | 4-65   | 4-75    | 4-85 | 4-95   | 4-65      |
| Schuykill Red Ash   | 4-55  | 4-65   | 4-75    | 4-85 | 4-95   | 4-65      |
| Shamokin  | 5-05  | 5-15   | 5-25    | 5-35 | 5-45   | 5-15      |
| Lorberry  | 5-65  | 5-75   | 5-85    | 5-95 | 6-05   | 5-75      |
| Lykens Valley   | 6-10  | 6-20   | 6-30    | 6-40 | 6-50   | 6-20      |
| Deliverable at the Williamsburgh Yard.                                      |       |        |         |      |        |           |
| Hard White Ash Coal   | 4-90  | 5-00   | 5-10    | 5-20 | 5-30   | 5-00      |
| Free Burning White Ash  | 4-90  | 5-00   | 5-10    | 5-20 | 5-30   | 5-00      |
| Schuykill Red Ash   | 4-90  | 5-00   | 5-10    | 5-20 | 5-30   | 5-00      |
| Shamokin  | 5-40  | 5-50   | 5-60    | 5-70 | 5-80   | 5-40      |

DELAWARE, LACKAWANNA AND WESTERN, at Hoboken, N. J.

Scranton 4-90 5-00 5-10 5-20 5-30 5-10

FRIGHTS—PER TON OF 2240 LBS.

From Elizabethport, Port Johnson, South Amboy, Hoboken & Weehawken.

From Philadelphia.

From Baltimore.

From Georgetown.

From New York.

From New Jersey.

From New England.

From the West.

From the South.

From the North.

From the East.

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From the East.







having been paid for Wallaroo, and £76. 10/ for Burra. In regard to Cullin bars considerable business has been reported. Various prices have been realized, according to terms. Cash prompts are now about £73; prompts from two to three months, 10/ to 20/ more. This improvement is chiefly owing to the operations of speculators, and prices have taken too sudden an upward turn to insure the stability of the market for any lengthened period. As soon as recent speculators can turn over their purchases to a profitable account they will probably turn round quickly and "bear" the market once more; consumers, therefore, should not play into the hands of speculators, but act cautiously under present circumstances, and wait until the demand from legitimate sources warrants the payment of higher prices. Tin.—The market has assumed a very unsettled appearance. Speculators may attempt to buoy up the market fictitiously, but, unless the consumption increases or supplies fall off, there is very little prospect of their turning the market to their own advantage. Prices may be upheld till the close of the month with the object of squeezing the "bears," and during the last day or two holders have succeeded in running up the price 20/ to 30/ per ton, but unless deliveries have been going on larger than it is expected, and the stock is greatly reduced, there is no reason why enhanced prices should be paid. The market is a little excited and unsettled at the moment, and the opinion of the most impartial in the trade is that prices cannot advance unless the bona fide demand improves.

Latest Liverpool prices are:

| Iron: f. o. b. in Liverpool, per ton. | £  | s. | d. | £  | s. | d. |
|---------------------------------------|----|----|----|----|----|----|
| Merchant bar                          | 6  | 15 | 0  | 6  | 10 | 0  |
| Merchant bar, in Wales                | 6  | 5  | 0  | 6  | 10 | 0  |
| Staffordshire                         | 7  | 5  | 0  | 6  | 10 | 0  |
| Hoop                                  | 6  | 0  | 0  | 6  | 10 | 0  |
| Sheet                                 | 15 | 0  | 0  | 15 | 0  | 0  |
| Nail rod                              | 7  | 10 | 0  | 6  | 10 | 0  |
| Bar, best crown                       | 7  | 5  | 0  | 6  | 10 | 0  |
| Boiler plates                         | 9  | 15 | 0  | 6  | 10 | 0  |

Tin Plates: f. o. b. in Liverpool, per box.

|                 | £ | s. | d. | £ | s. | d. |
|-----------------|---|----|----|---|----|----|
| Charcoal, I. C. | 1 | 4  | 6  | 1 | 6  | 6  |
| Coke, I. C.     | 1 | 0  | 0  | 1 | 2  | 0  |

Copper: Delivered in Liverpool, per ton.

|                    | £  | s. | d. | £  | s. | d. |
|--------------------|----|----|----|----|----|----|
| Bolt and Sheathing | 84 | 0  | 0  | 84 | 0  | 0  |
| Thin               | 75 | 0  | 0  | 75 | 0  | 0  |
| Tough cake         | 75 | 0  | 0  | 75 | 0  | 0  |
| Best selected      | 70 | 0  | 0  | 70 | 0  | 0  |

The Monthly Iron and Metal Circular of Messrs. Sanders Brothers, London, &c., dated July 24, is, in some respects, of considerable interest just now, and I therefore give rather long extracts from it, as follows:

Business in metals is especially restricted, and almost without exception prices show a reduction as compared with the figures current a month since. As long as the downward tendency continues, the present marked indisposition to operate will last.

Copper.—Our present quotations are:

|             | £       | s.     | d.      | £       | s.      | d.      |
|-------------|---------|--------|---------|---------|---------|---------|
| Ores & Reg- | 0 13 9  | 0 14 6 | 0 16 0  | 0 17 0  | 0 17 0  | 0 17 0  |
| Chill Bars  | 70 10 0 | 73 0 0 | 73 10 0 | 81 10 0 | 81 10 0 | 81 10 0 |
| Ingots      | 94 0 0  | 94 0 0 | 94 0 0  | 94 0 0  | 94 0 0  | 94 0 0  |
| Eng. tough  | 75 0 0  | 76 0 0 | 76 0 0  | 87 0 0  | 87 0 0  | 87 0 0  |
| English Se- | 76 0 0  | 77 0 0 | 77 0 0  | 88 0 0  | 88 0 0  | 88 0 0  |
| Eng. Manu-  | 82 0 0  | 86 0 0 | 86 0 0  | 93 0 0  | 93 0 0  | 93 0 0  |

Month ended 30th June.

|                             | 1874.   | 1875.   | 1876.   |
|-----------------------------|---------|---------|---------|
| Exports to U. S. unmanu-    | 1874.   | 1875.   | 1876.   |
| factured                    | 22,630  | 18,883  | 25,470  |
| Exports to other countries, |         |         |         |
| unmanufactured              | 900     | 900     | 900     |
| Exports to U. S., manu-     |         |         |         |
| factured                    | 22,455  | 18,773  | 21,011  |
| Exports to other countries, |         |         |         |
| unmanufactured              | 97,876  | 99,184  | 124,972 |
| Exports to U. S., manu-     |         |         |         |
| factured                    | 706     | 93      | 189     |
| Exports to other countries, |         |         |         |
| unmanufactured              | 109,318 | 113,688 | 104,403 |

The next sale of Wallaroo is appointed for September, when about a similar quantity to that sold last month will be offered. The total stocks on the 1st of the present month, as compared with those on the 1st of June, showed scarcely any variation. English copper has partaken of the decline in other sorts, but low prices have not stimulated demand, and we have to report a very lifeless market for this article. Consumers will only purchase in a hand-to-mouth manner, and business is extremely difficult to put through. Manufactured copper continues in very quiet demand. A few orders for Indian sheets were placed last month at low prices, but the exchange with India renders business in that quarter for the time being almost entirely impracticable. The home trade does not evince much activity.

Rails.—£5. 12/6 for heavy sections, compared with £6. 15/ same date last year.

Month ended 30th June.

|                            | 1874.  | 1875.  | 1876.  |
|----------------------------|--------|--------|--------|
| Exports to United States   | 1874.  | 1875.  | 1876.  |
| Exports to other countries | 19,650 | 55,242 | 36,899 |

Six Months ended 30th June.

|                            | 1874.  | 1875.  | 1876.  |
|----------------------------|--------|--------|--------|
| Exports to United States   | 1874.  | 1875.  | 1876.  |
| Exports to other countries | 61,939 | 15,374 | 99,528 |

The rail market has not undergone any particular change during the past month. South Wales makers appear to be extremely short of work, and display in almost all cases readiness to make considerable sacrifices rather than allow orders to pass them. Under these circumstances it is of course not easy to give an accurate idea of prices, as each order is made the subject of special negotiation.

Steel Rails.—This branch of the trade continues in a fairly active state, but does not present any special feature. Price depends entirely on specification; double headed rails of heavy sections for English roads have been sold as low as £7. 5/ on trucks at the works; flange sections, which are lighter and more difficult to roll, could be placed at about £7. 15/ free on board.

Spiegeleisen is in moderately good request, and there is a fair business doing at current figures. We quote good quality for the time being, £4. 15/ f. o. b. continental port; English, £6. 10/ to £7. 2/6; according to manganese contents, say, 15 to 20 per cent.

Lead.—Our present quotations are:

|                 | Per ton. | £  | s. | d. |
|-----------------|----------|----|----|----|
| W. B.           | 222      | 0  | 22 | 0  |
| L. B.           | 20       | 15 | 22 | 15 |
| Lead Co.        | 20       | 10 | 22 | 10 |
| Ordinary brands | 20       | 5  | 22 | 5  |

Month ended 30th June.

|                            | 1874. | 1875. | 1876. |
|----------------------------|-------|-------|-------|
| Exports to United States   | 171   | 250   | 250   |
| Exports to other countries | 3,505 | 3,371 | 2,808 |

extent of about 5/ to 10/ per ton. The amount of business done has been small, and as we close there is very little demand stirring.

Regulus of Antimony.—£62 as compared with £58 same date last year. Business throughout the month has been somewhat limited, and we close with a quiet market.

Tin.—Our quotations to-day are:

|                          | Per ton. | £       | s. | d. |
|--------------------------|----------|---------|----|----|
| English L. and F. Ingots | £79. 0/  | £85. 0/ |    |    |
| " " in barrels           | 80. 0/   | 86. 0/  |    |    |
| " refined                | 81. 0/   | 87. 0/  |    |    |
| Banca                    | 76. 0/   | 85. 0/  |    |    |
| Straits                  | 73. 10/  | 78. 10/ |    |    |
| Australian               | 73. 10/  | 75. 10/ |    |    |

Month ended 30th June.

|                            | 1874. | 1875. | 1876. |
|----------------------------|-------|-------|-------|
| Exports to United States   | 1,640 | 116   | 1,354 |
| Exports to other countries | 9,135 | 9,491 | 6,254 |

Six months ended 30th June.

|                            | 1874.  | 1875.  | 1876.  |
|----------------------------|--------|--------|--------|
| Exports to United States   | 36,349 | 10,349 | 6,114  |
| Exports to other countries | 53,180 | 44,788 | 48,175 |

The imports of tin into England have been:

|                      | 1874.  | 1875.  | 1876.   |
|----------------------|--------|--------|---------|
| Month ended June 30. | 1874.  | 1875.  | 1876.   |
| Cwts. Cwts. Cwts.    | 80,994 | 80,994 | 173,384 |

The following statement shows the present position of tin:

|                               | May 1, 1876. | June 1, 1876. | July 1, 1876. | July 1, 1875. | July 1, 1874. |
|-------------------------------|--------------|---------------|---------------|---------------|---------------|
| Tons. Tons. Tons. Tons. Tons. |              |               |               |               |               |
| Foreign tin in London         | 7,523        | 7,470         | 7,090         | 6,197         | 2,556         |
| Banca & Billiton in Holland   | 1,764        | 1,363         | 1,949         | 1,197         | 1,577         |

Stocks. 9,287 8,832 8,969 7,334 4,133

Banca in hand of the Dutch Trading Co. unsold. 2,044 2,310 1,792 3,517 4,374

Foreign tin afloat for Europe. 3,422 3,325 3,180 2,571 1,850

14,753 14,467 13,941 13,412 10,387

Foreign tin, after receding during the last week of June to about £73 per ton, improved in the early part of this month, and touched as high as £75. This rise was consequent on the unusually heavy deliveries for the month of June, which from Holland and London amounted to 2420 tons—nearly 1600 tons being from London warehouse, a quantity 25 per cent. in excess of the average monthly delivery for the first five months of this year, and this increase is in face of the fact that tin plate makers are working two-thirds time only, and in some cases less. The market has eased off again since the report above alluded to, and we are now back to £73 for Straits and Australian, at which figure a steady business is passing. The stocks on 1st instant showed a considerable improvement for the month, as will be seen from above figures, and altogether the statistical position of tin, at the present time, is decidedly favorable. If the deliveries for the current month, which are being closely watched, turn out good, we shall probably see higher prices. The demand from the Continent continues pretty active. The Dutch Company announce that their next sale will take place on 26th instant, when 20,900 slabs will be offered. English Tin has remained during the month almost stationary in price, with a fair amount of business doing.

Spelter.—Ordinary Silesian £22. 10/ compared with £24 same date last year. The market has had a weakening tendency during the past month, and is in anything but a settled state. English has declined about 10/ per ton, today's quotation being £23 to £23. 10/ f. o. b.

Month ended 30th June.

|                            | 1874. | 1875. | 1876. |
|----------------------------|-------|-------|-------|
| Exports to United States   | 8,769 | 9,605 | 6,896 |
| Exports to other countries | 1,819 | 4,175 | 3,595 |

Month ended 30th June.

|                            | 1874.  | 1875.  | 1876.  |
|----------------------------|--------|--------|--------|
| Exports to United States   | 49,717 | 52,323 | 43,005 |
| Exports to other countries | 13,817 | 19,807 | 21,359 |

The tin plate market has during the past two or three weeks improved materially, and a considerable amount of business has been done for the States. When coke tin got down as low as 18/ to 18.6, buyers came into the market and bought pretty freely, the consequence being that a good many makers found themselves well filled with work for a month or so, and have since been asking 1/ to 1.6 per box ad.

S. H. & E. Y. MOORE, 68 Lake Street, CHICAGO, ILL., AGENTS FOR

PROVIDENCE TOOL COMPANY, PROVIDENCE, R. I. Threshing Machine Teeth, Cold Pressed Nuts, Chain Links, Ship Chandlery, &c.

THE READING BOLT AND NUT WORKS, READING PA. Hot Pressed Nuts, Machine Bolts, Log Screws, Skein Bolts, Bolt Ends, &c.

WM. H. HASKELL & CO., PAWTUCKET, R. I. Gimlet Point Coach Screws, Bolts, &c.

FALLS RIVET COMPANY, CUYAHOGA FALLS, O. Norway Iron Rivets.

"CLIMAX" Barn Door Hangers, Manufactured and for sale by S. H. & E. Y. MOORE, 68 Lake Street, Chicago, Ill.

The wheel is acted upon directly by the rail. The hub of this wheel revolves within chilled iron rollers. The difference between the diameter of the wheel and the diameter of the hub gives the leverage gained. The hanger has the advantage of this leverage in addition to that obtained from the use of anti-friction roller bearings, and in this respect, as well as in others apparent on examination, is superior to any yet offered to the trade. It requires no oiling.

IT COMBINES SIMPLICITY, EASE OF ACTION, STRENGTH, DURABILITY, BEAUTY OF DESIGN. FOR SALE BY

vance. Demand continues to become more active, and we believe these higher figures are in some cases being obtained now. The nearest quotation we can give at the moment for coke tin, of what are known as the Oil Brands, is 19/ to 20/. Charcoal tin, grade of E. C. C. and equal, cannot be bought now under 25/, and for lower quality, such as Allaway, &c., 23/6 to 24/ is asked for specifications of not less than half cross. Charcoal grades of the S. T. P. Dean, &c., grade were done as low as 20/, but this figure is of course no longer practicable, and we understand that within the last day or 21/ has been paid for this class of plate. For coke grades 18/ to 19/ is the present quotation. Those makers still continue to work only two weeks out of every three, who formed an association some time ago, and some others have stopped operations altogether, on account of difficulties to submit to a reduction in wages. The production of plates is thus substantially curtailed, and evidence of the fact is seen in the reduction of stocks. Several makers have recently succumbed to the effects of the long period of depression through which the tin plate trade has been passing. For last month and the first six months of the present and two preceding years, shipment of tin plates to the United States, according to the Board of Trade returns, were as follows:

|              | 1874.   | 1875.     | 1876.   |
|--------------|---------|-----------|---------|
| June         | 8,769   | 9,605     | 6,896   |
| January-June | 175,390 | 192,100   | 137,930 |
|              | 49,717  | 52,323    | 43,005  |
|              | 694,340 | 1,046,450 | 860,100 |

A. PARDEE, Hazelton, Pa. J. G. FELL, Phila.

A. PARDEE & CO., 303 Walnut St., PHILADELPHIA.

MINERS AND SHIPPERS OF

Lehigh Coals.

The following superior and well-known Lehigh Coals are mined by ourselves, and firms connected with us, viz.

A. Pardee & Co. {HAZLETON, CRANBERRY, SUGAR LOAF

G. B. Markle & Co. {JEDDO, HIGHLAND.

Pardee, Bro. & Co. LATTIMER

OFFICES: WM. LILLY, Mauch Chunk, Pa. WM. MERSHON, Agent, 111 Broadway N.Y. WM. H. DAVIS, Agent, Easton, Pa.

Lehigh Valley Coal Co., MINERS AND SHIPPERS OF

Lehigh, Wyoming White & Red Ash, (BALTIMORE VEIN.)

Office, cor. Fairmount & Church Sts. Coal and Iron Exchange Building. GEORGE B. NEWTON, Agent. Shipments by Railroad and Morris Canal direct from the mines, and from Perth Amboy and Jersey City, for all points.

WM. ESTERBROOK Coal Hods, FIRE SHOVELS, Etc.

311 Cherry St., PHILADELPHIA.

CHAS. FORSCHNER, Manufacturer of

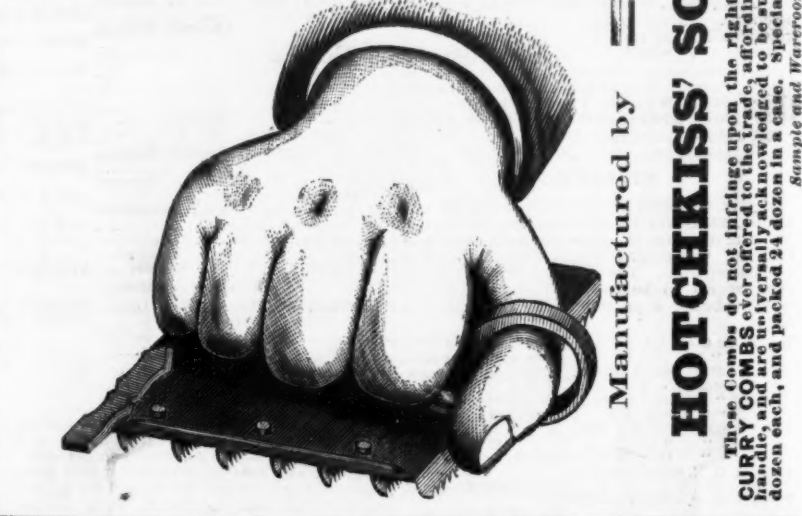
Butchers' Tools, Machinery, and Excelsior Upright Sausage Stuffers. (Forschner's Patent.)

41 Livingston St., bet. Forsyth and El-drider, N. Y. Send for Illustrated Price List with Specified Dimensions.

# HOTCHKISS' PATENT NOVELTY COMBS.



THIS CUT ILLUSTRATES THE GRASPING OF THE COMB.



## BLAKE BROTHERS HARDWARE CO., New Haven, Conn.

ESTABLISHED 1830. Manufacturers of

BUILDERS' HARDWARE, BUTTS, HOUSE TRIMMINGS, CARRIAGE, And GENERAL HARDWARE

The attention of our old Customers and the Trade generally is invited to our new Illustrated Catalogue just issued, comprising a full assortment of our well known staple goods: Butts (Drilled and Wire jointed), Thumb Latches, Sash, Upright Screw and Side Pulleys, Wardrobe and Harness Hooks, Draw Pulls, Nut Crackers, Cork Screws, &c., &c. Also several new and attractive styles of Fancy Hardware, at prices to suit the times.

Our new Patent Fancy Open Work Cap Butt, with Ornamented Knuckle, in Real and Imitation Bronze, and our Nickel Plated Cap Butts, with concealed Screws, are the handsomest in the market, and are attracting much attention. While making plain and japanned goods a specialty, we are prepared to meet the increasing demand for ornamented bronze and nickel plated House Trimmings. Goods packed in boxes or bundles, as may be preferred. For catalogue and price list address

## BLAKE BROTHERS HARDWARE CO., New Haven, Conn.

The only GENUINE D. R. BARTON Tools, ARE MADE BY

## THE D. R. BARTON TOOL CO.,

Cor. Mill and Furnace Streets, ROCHESTER, N. Y.

AGENCIES: HEATON & DENCKLA, 507 Commerce Street, Philadelphia, Pa. H. O. STRATTON, 33 Oliver Street, Boston, Mass.

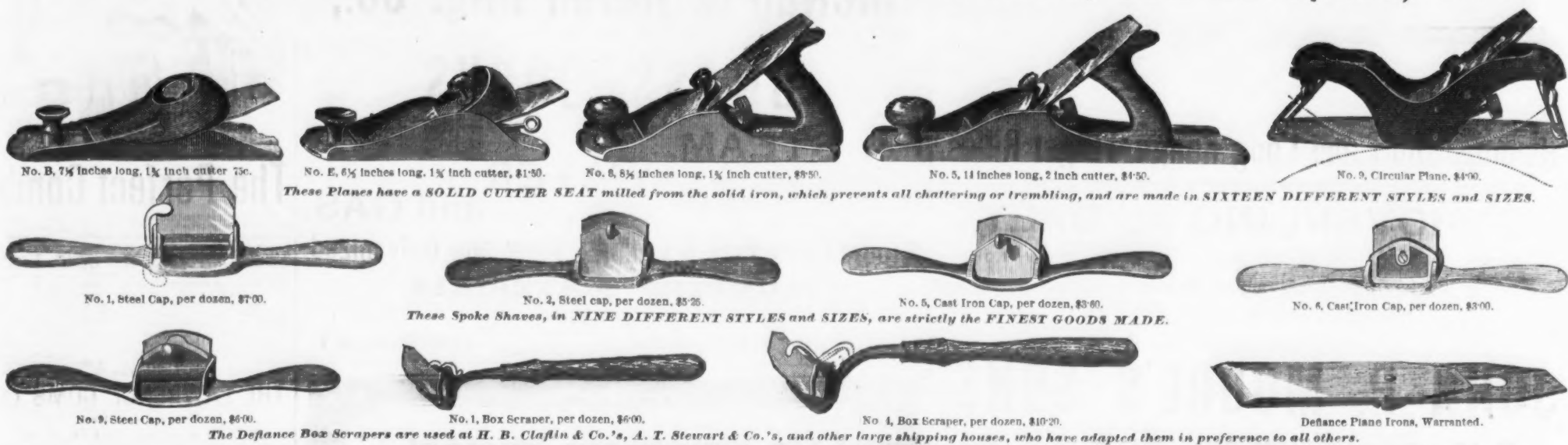
## GREENFIELD TOOL CO.,

Greenfield, Mass. Sole Manufacturers of the Celebrated "Diamond" PLANE IRONS.

EXTRA PLATED TABLE CUTLERY. PATENT FORGED OX SHOES. The only shoe made with concavity to fit hoof. BENCH AND MOULDING PLANES of every description, &c., &c. Drop Forgings to order. Address for Catalogue with stamp.



# Defiance Metallic Bench Planes, Spoke Shaves, Box Scrapers, Etc.



Send for Descriptive Circular.

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## L. COES' Genuine Improved Patent SCREW WRENCHES.

Manufactured by

L. COES & CO.,  
Worcester, Mass.

Established in 1820.

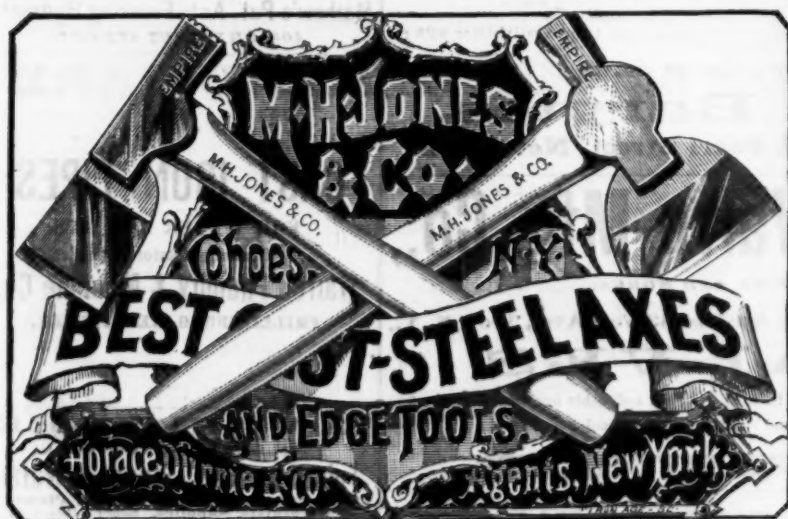
Registered March 21, 1874.

We invite the particular attention of the trade to our New Straight Bar Wrench, widened, full size of the larger part of the so called "reinforced or jag bar." Also our enlarged jaw, made with ribs on the inside, having a full bearing on the front of bar (see sectional view), making the jaw fully equal to any strain the bar may be subjected to.

These recent improvements in combination with the nut inside the ferrule firmly screwed up flush, against square, solid bearings (that cannot be forced out of place by use), verifies our claim that we are manufacturing the strongest Wrench in the market.

We would also call attention to the fact, that in 1869 we made several important improvements (secured by patents), on the old Wrench previously manufactured by L. & A. G. Coes which were at once closely imitated and sold as the Genuine Wrench by certain parties who seem to rely upon our improvements to keep up their reputation as manufacturers, and although the fact of their imitating our goods may be good evidence that we manufacture a superior Wrench, we wish the trade may not be deceived on the question of originality. Trusting the trade will fully appreciate our recent efforts, both in improvements on the Wrench and in the adoption of a Trade Mark, we would caution them against imitations. None genuine unless stamped.

"L. COES &amp; CO."

Warehouse, 97 Chambers St., & 81 Reade Sts., N. Y.  
HORACE DURRIE & CO., Sole Agents.

## GOLD MEDAL Non-Extensible Razor Belt.

PATENTED JULY 25, 1871.

RE-ISSUED MAY 13, 1873, and JUNE 9, 1874.

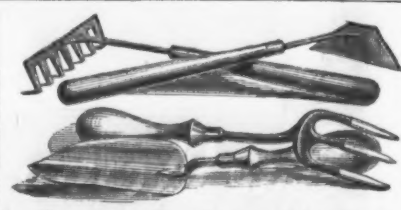
In this Strap the liability of the leather to stretch and become loose and porous is prevented by the use of a patented non-extensible base, which supports the leather and secures

PERMANENT ELASTICITY.

We make this style with single rod, double rod, and wood frames, and intend that it shall, in quality compare favorably with our other well known brands.

BENJAMIN F. BADGER &amp; SON, Manufacturer

Badger Place, Charlestown, Mass.



This set of GARDEN TOOLS, is put up in a nice paper box, and is superior to any other in the market. The tools are made of the best quality of Steel, highly polished, and of malleable iron polished or painted, with birch handles. We will make it an object for every dealer to handle them.

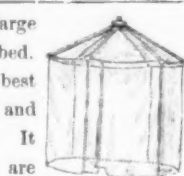
PRICE \$15, PER DOZEN SETS.

## CENTENNIAL CHAIR.



This Chair is made of the best second growth White Ash, finished on the wood, with Brussels Carpet Seat. It shuts up to the size of a single chair post, and weighs only one pound. Every person who forgets to take one with him when he goes to the Centennial, will be sorry when he gets there, as no chairs are provided for visitors, and they get very tired. Every store in the land can sell a few of them at a profit. They are a very popular article here.

PRICE, \$12 PER DOZEN.



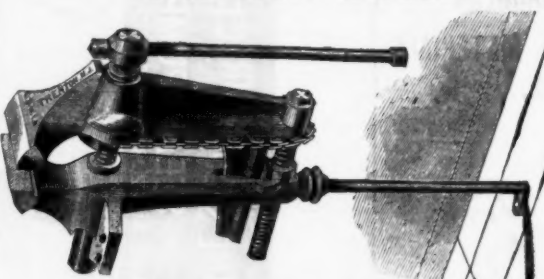
This MOSQUITO BAR is large enough to cover a full size bed. It has a nice Folding Frame, best quality of netting, with cord and ring complete for hanging. It is as good as those which are usually sold for \$5.00.

PRICE, \$24 PER DOZEN.

## MILLERS FALLS CO., 74 Chambers St., N. Y.

Corner BROADWAY.

### The New Double Screw Parallel "Leg" Vise.



We are now ready to furnish, as the result of more than thirty years' experience, our latest style of Vise—the best yet made. It is stronger than any other, whether of Foreign or of American make; always parallel and holding with a tighter "grip." The jaws are of convenient shape for the workman to get near his work equally well for filing or chipping. Instead of the heavy, clumsily formed jaws of the cast iron Single Screw Vises of the common "parallel" type, and which, depending upon slide, alone for preserving parallelism, can never be screwed up very hard without "jamming" on the slides or breaking.

Our New Vise combines all the advantages of the "Peter Wright" Leg Vise, of strength and lightness, fastening to the floor and bench, and at the same time greatly superior to it: it is always perfectly parallel at all points of opening, and never gets out of line. Embodying the same general principle as the well known Chain Vise, so long made by us, we have by new, scientific proportioning of all the parts, and with our recently improved metals for their manufacture, obtained so perfect a tool, that we now warrant these Vises for three years from date of manufacture stamped upon each.

The jaws are of best Tool Cast Steel, welded on, file cut and properly hardened. The screws are forged of the best refined iron, and work in solid cut thread boxes.

The lower screw maintains the parallel position of the two jaws, by having exact motion with the upper working screw through the connecting chain which regulates it.

The chain is very accurately made of steved links and rivets, and having no strain of the work upon it, is therefore as durable as all the other parts.

Prices with Special Discounts to the Trade.

|  |        |
|--|--------|
| No. 1, Jaws 3 1/2 in. x 1/2 in. Screws 3/4 in. diameter. Lever 9 in. long. Opens 4 1/2 in. | \$5.00 |
| " 2, " 4 1/2 in. x 1/2 in. " 1 1/4 in. " " 12 in. " " 5 1/2 in.                            | 12.00  |
| " 3, " 5 1/2 in. x 1 1/4 in. " 1 3/4 in. " " 18 in. " " 6 1/2 in.                          | 17.00  |
| " 4, " 6 1/2 in. x 1 3/4 in. " 2 in. " " 24 in. " " 7 1/2 in.                              | 22.00  |
| " 5, " 7 in. x 1 3/4 in. " 2 1/4 in. " " 28 in. " " 8 in.                                  | 28.00  |
| " 6, " 8 in. x 1 3/4 in. " 2 1/2 in. " " 30 in. " " 8 1/2 in.                              | 30.00  |

All sizes of these Vises furnished with Swivel Attachment, at an additional cost of \$1 to \$3. Sold at the General Agencies.

THESE GOODS ARE SOLD BY THE GENERAL AGENTS (with special discounts to the trade)

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MANUFACTURED BY

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Send for pricelist. Buffalo, N. Y.

RUSSELL & ERWIN MFG. CO. NEW YORK & PHILADELPHIA AGENTS.

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Hunting, Short and Long Range Target Rifles.  
SEND FOR PRICE LIST.

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Standard O. K., F. & W. Double Action, Wesson & Harrington new line Revolvers. Send for Reduced Price List.

ESTABLISHED 1823.

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Sole Agents in the United States for FOREHAND & WADSWORTH'S NEW MODEL SWAMP ANGEL and other Revolvers.

CREEDMOOR SEVEN SHOT NICKEL PLATED, The Cheapest Revolver made.

CREEDMOOR, 32-100 REVOLVERS.

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ELEY'S NEW "STAR" CARTRIDGE SHELLS. Also THE GASTIGHT BLUE AND BROWN SHELLS can be procured of all Gun Makers and dealers in Ammunition in the United States.

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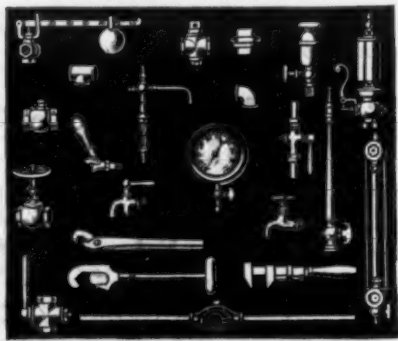
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FLANGED PIPE,

Cast Iron

RADIATORS

and BOILERS.



Brass & Iron

STEAM

Gas & Water

FITTINGS.

PLUMBERS'

MATERIALS.

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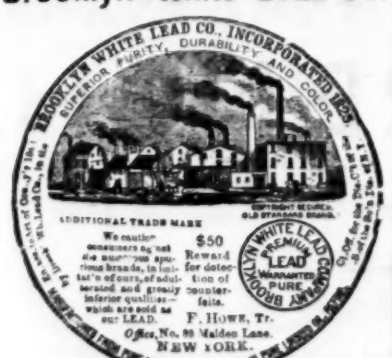
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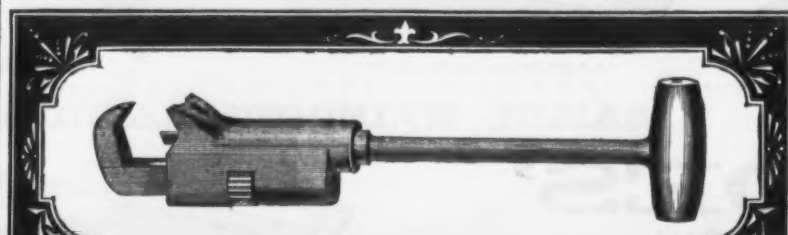
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MADE ENTIRELY OF SOLID CAST STEEL

Cuts Wrought Iron, Brass and Copper Pipes, Round Iron &c perfectly true without leaving burr on pipe contracting or splitting it. Cuts out a chip similar to a lathe tool. The knife may be removed and ground. Send for descriptive circular to manufacturers.

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PHILADELPHIA PA.



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STEAM-PUMP  
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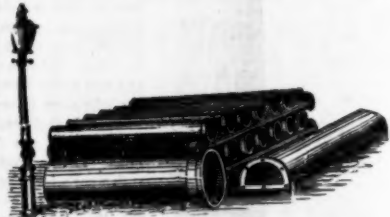
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# The Iron Age Directory

and index to Advertisements.

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| <b>Alarm Whistles and Speaking Tubes.</b>            | <b>Alarm Whistles.</b>                               |
| Frederick C. A. & Co., 18 Fulton, N. Y.              | Frederick C. A. & Co., 18 Fulton, N. Y.              |
| Ostrander W. B. 19 Ann, N. Y.                        | Ostrander W. B. 19 Ann, N. Y.                        |
| <b>Alarm Tills.</b>                                  | <b>Alarm Tills.</b>                                  |
| Packer & Dorsey, Indianapolis, Ind.                  | Packer & Dorsey, Indianapolis, Ind.                  |
| <b>Animal Poles.</b>                                 | <b>Animal Poles.</b>                                 |
| Bishop & Benedict, Berea, O.                         | Bishop & Benedict, Berea, O.                         |
| <b>Anvils, Manufacturers of.</b>                     | <b>Anvils, Manufacturers of.</b>                     |
| Fisher & Norris, Trenton, N. J.                      | Fisher & Norris, Trenton, N. J.                      |
| <b>Axles, Bts. etc., Manufacturers of.</b>           | <b>Axles, Bts. etc., Manufacturers of.</b>           |
| Clark Wm. A., Westville, Conn.                       | Clark Wm. A., Westville, Conn.                       |
| The Conn. Valley Mfg. Co., Centerbrook, Conn.        | The Conn. Valley Mfg. Co., Centerbrook, Conn.        |
| The Douglass Mfg. Co., 62 Route, N. Y.               | The Douglass Mfg. Co., 62 Route, N. Y.               |
| <b>Axles, Edge Tools, etc., Manufacturers of.</b>    | <b>Axles, Edge Tools, etc., Manufacturers of.</b>    |
| D. R. Barton Tool Co., Rochester, N. Y.              | D. R. Barton Tool Co., Rochester, N. Y.              |
| Jones, M. H. & Co., Cohoes, N. Y.                    | Jones, M. H. & Co., Cohoes, N. Y.                    |
| Ten Eyck Axe Mfg. Co., Cohoes, N. Y.                 | Ten Eyck Axe Mfg. Co., Cohoes, N. Y.                 |
| <b>Axles, Springs, etc., Manufacturers of.</b>       | <b>Axles, Springs, etc., Manufacturers of.</b>       |
| Brown D. Arthur & Co., Fisherville, Concord, N. H.   | Brown D. Arthur & Co., Fisherville, Concord, N. H.   |
| Clark, Smith & Co., Port Plain, N. Y.                | Clark, Smith & Co., Port Plain, N. Y.                |
| Cook R. & Sons, Winsted, Conn.                       | Cook R. & Sons, Winsted, Conn.                       |
| Spring Perch Co., Bridgeport, Conn.                  | Spring Perch Co., Bridgeport, Conn.                  |
| Tomlinson Spring & Axle Co., Bridgeport, Conn.       | Tomlinson Spring & Axle Co., Bridgeport, Conn.       |
| Hotchkiss Guy C. Feed & Co., Brooklyn, E. D.         | Hotchkiss Guy C. Feed & Co., Brooklyn, E. D.         |
| <b>Band Saws and Tools for Brazing &amp;c., Im-</b>  | <b>Band Saws and Tools for Brazing &amp;c., Im-</b>  |
| <b>porters of.</b>                                   | <b>porters of.</b>                                   |
| Geatral George & Son, 39 W. 4th, N. Y.               | Geatral George & Son, 39 W. 4th, N. Y.               |
| <b>Barb Wire Hangers.</b>                            | <b>Barb Wire Hangers.</b>                            |
| Smith & E. & Co., Chicago, Ill.                      | Smith & E. & Co., Chicago, Ill.                      |
| <b>Bed Screws, Maker of.</b>                         | <b>Bed Screws, Maker of.</b>                         |
| Shelton Co., Birmingham, Conn.                       | Shelton Co., Birmingham, Conn.                       |
| <b>Bellows, Manufacturers of.</b>                    | <b>Bellows, Manufacturers of.</b>                    |
| Churchyard, Joseph, Buffalo, N. Y.                   | Churchyard, Joseph, Buffalo, N. Y.                   |
| Newcomb Bro. & Co., 365 Water, N. Y.                 | Newcomb Bro. & Co., 365 Water, N. Y.                 |
| Scott Geo. M., Chicago, Ill.                         | Scott Geo. M., Chicago, Ill.                         |
| <b>Bells.</b>  | <b>Bells.</b>  |
| Baltimore Bell and Brass Works, 53 and 55 Hol-       | Baltimore Bell and Brass Works, 53 and 55 Hol-       |
| iday, Baltimore, Md.                                 | iday, Baltimore, Md.                                 |
| Williams E. A. & Son, 107 Plymouth, Jersey City,     | Williams E. A. & Son, 107 Plymouth, Jersey City,     |
| N. J.  | N. J.  |
| <b>Belt (Sleek).</b>                                 | <b>Belt (Sleek).</b>                                 |
| Bevin Bros. Mfg. Co., Easthampton, Conn.             | Bevin Bros. Mfg. Co., Easthampton, Conn.             |
| <b>Blind Hinges.</b>                                 | <b>Blind Hinges.</b>                                 |
| The Holbrook Patent Blind Hinge Mfg. Co., Water-     | The Holbrook Patent Blind Hinge Mfg. Co., Water-     |
| town, N. Y.  | town, N. Y.  |
| <b>Bolting, Leather, Makers of.</b>                  | <b>Bolting, Leather, Makers of.</b>                  |
| Alexander Bros., 412 N. 50, Phila.                   | Alexander Bros., 412 N. 50, Phila.                   |
| Any Charles W., 103 3d, Phila.                       | Any Charles W., 103 3d, Phila.                       |
| Forepaugh Wm. F. Jr. & Bros., Phila.                 | Forepaugh Wm. F. Jr. & Bros., Phila.                 |
| <b>Bird Cages, Makers of.</b>                        | <b>Bird Cages, Makers of.</b>                        |
| Lindeman O. & Co., 254 Pearl, N. Y.                  | Lindeman O. & Co., 254 Pearl, N. Y.                  |
| Maximilian John, 100 Chambers, N. Y.                 | Maximilian John, 100 Chambers, N. Y.                 |
| Osborn Mfg. Co., 70 Blacker, N. Y.                   | Osborn Mfg. Co., 70 Blacker, N. Y.                   |
| <b>Bit Braces, Manufacturers of.</b>                 | <b>Bit Braces, Manufacturers of.</b>                 |
| Milner's Mill Mfg. Co., 14 Chambers, N. Y.           | Milner's Mill Mfg. Co., 14 Chambers, N. Y.           |
| <b>Blowers, Makers of.</b>                           | <b>Blowers, Makers of.</b>                           |
| Kerrison Portable Forge Co., Philadelphia.           | Kerrison Portable Forge Co., Philadelphia.           |
| <b>Blot Machines, Makers of.</b>                     | <b>Blot Machines, Makers of.</b>                     |
| Forrest S. C. & Co.                                  | Forrest S. C. & Co.                                  |
| <b>Bolts (Screw).</b>                                | <b>Bolts (Screw).</b>                                |
| Samuel Hall's Son & Co., 229 W. 10th, N. Y.          | Samuel Hall's Son & Co., 229 W. 10th, N. Y.          |
| <b>Borax.</b>  | <b>Borax.</b>  |
| Peter Chas. & Co., New York.                         | Peter Chas. & Co., New York.                         |
| Pope Thomas J. & Bro., 393 Pearl, N. Y.              | Pope Thomas J. & Bro., 393 Pearl, N. Y.              |
| <b>Brass Brackets.</b>                               | <b>Brass Brackets.</b>                               |
| Tiebout W. J., 24 Pearl, N. Y.                       | Tiebout W. J., 24 Pearl, N. Y.                       |
| <b>Brass, Manufacturers of.</b>                      | <b>Brass, Manufacturers of.</b>                      |
| Amos B. Brass and Copper Co., 19 Cliff, N. Y.        | Amos B. Brass and Copper Co., 19 Cliff, N. Y.        |
| Baltimore Bell and Brass Works, 53 and 55 Hol-       | Baltimore Bell and Brass Works, 53 and 55 Hol-       |
| iday, Baltimore, Md.                                 | iday, Baltimore, Md.                                 |
| Benedict & Voss, 50 Chambers, N. Y.                  | Benedict & Voss, 50 Chambers, N. Y.                  |
| Davol John & Sons, 100 John, N. Y.                   | Davol John & Sons, 100 John, N. Y.                   |
| Holmes, Booth & Co., 230 Chambers, N. Y.             | Holmes, Booth & Co., 230 Chambers, N. Y.             |
| Rickoff Mfg. Co., 230 Pearl, N. Y.                   | Rickoff Mfg. Co., 230 Pearl, N. Y.                   |
| Manhattan Brass Co., 31 Reade, N. Y.                 | Manhattan Brass Co., 31 Reade, N. Y.                 |
| Milner & Edger, 100 Chambers, N. Y.                  | Milner & Edger, 100 Chambers, N. Y.                  |
| Plano & Atwood, Mfg. Co., 21 Chambers, N. Y.         | Plano & Atwood, Mfg. Co., 21 Chambers, N. Y.         |
| Scovill Mfg. Co., 421 Broome, N. Y.                  | Scovill Mfg. Co., 421 Broome, N. Y.                  |
| The Whitcomb Mfg. Co., 30 Barclay, N. Y.             | The Whitcomb Mfg. Co., 30 Barclay, N. Y.             |
| Waterbury Brass Co., 32 Beekman, N. Y.               | Waterbury Brass Co., 32 Beekman, N. Y.               |
| <b>Brick Presses, Makers of.</b>                     | <b>Brick Presses, Makers of.</b>                     |
| Carnell F. L. & D., 184 Germantown Ave., Phila.      | Carnell F. L. & D., 184 Germantown Ave., Phila.      |
| <b>Bridge Builders.</b>                              | <b>Bridge Builders.</b>                              |
| Mosley Iron Bridge and Roof Co., 5 Day, N. Y.        | Mosley Iron Bridge and Roof Co., 5 Day, N. Y.        |
| Leighton Bridge and Iron Works, Rochester, N. Y.     | Leighton Bridge and Iron Works, Rochester, N. Y.     |
| <b>Brushes (Whisk).</b>                              | <b>Brushes (Whisk).</b>                              |
| Frederic F. W. John, N. Y.                           | Frederic F. W. John, N. Y.                           |
| <b>Butcher and Sheep Scales, Manufacturers of.</b>   | <b>Butcher and Sheep Scales, Manufacturers of.</b>   |
| Wilson John, Sheffield, England.                     | Wilson John, Sheffield, England.                     |
| <b>Butchers' Machines.</b>                           | <b>Butchers' Machines.</b>                           |
| Forrester Chas., 41 Livingston, N. Y.                | Forrester Chas., 41 Livingston, N. Y.                |
| <b>Butts and Hinges.</b>                             | <b>Butts and Hinges.</b>                             |
| American Spring and Bolt Co., 32 Beekman, N. Y.      | American Spring and Bolt Co., 32 Beekman, N. Y.      |
| Temple, Birge & Co., St. Louis, Mo.                  | Temple, Birge & Co., St. Louis, Mo.                  |
| Temple, Birge & Co., 38 Chambers, N. Y.              | Temple, Birge & Co., 38 Chambers, N. Y.              |
| <b>Carriage Horses, Makers of.</b>                   | <b>Carriage Horses, Makers of.</b>                   |
| Townsend, Wilson & Hubbard, Phila.                   | Townsend, Wilson & Hubbard, Phila.                   |
| <b>Carriage Hardware, Makers of.</b>                 | <b>Carriage Hardware, Makers of.</b>                 |
| Carroll H. D. & Co., 111 Broadway, N. Y.             | Carroll H. D. & Co., 111 Broadway, N. Y.             |
| <b>Car Wheels, etc., Manufacturers of.</b>           | <b>Car Wheels, etc., Manufacturers of.</b>           |
| Taylor Iron Works, High Bridge, N. J.                | Taylor Iron Works, High Bridge, N. J.                |
| <b>Casters, (Furniture).</b>                         | <b>Casters, (Furniture).</b>                         |
| Toler John, Sons & Co., Newark, N. J.                | Toler John, Sons & Co., Newark, N. J.                |
| <b>Chemical and Physical Instruments.</b>            | <b>Chemical and Physical Instruments.</b>            |
| Hall & Harbison, 111 Chambers, N. Y.                 | Hall & Harbison, 111 Chambers, N. Y.                 |
| <b>Chisels.</b>                                      | <b>Chisels.</b>                                      |
| Buck Bros., Millbury, Mass.                          | Buck Bros., Millbury, Mass.                          |
| <b>Coal, Makers of.</b>                              | <b>Coal, Makers of.</b>                              |
| Lehigh Valley Coal Co., for Courlandt and Church,    | Lehigh Valley Coal Co., for Courlandt and Church,    |
| N. Y.  | N. Y.  |
| Pardee A. & Co., 111 Broadway, N. Y.                 | Pardee A. & Co., 111 Broadway, N. Y.                 |
| <b>Coal Vases.</b>                                   | <b>Coal Vases.</b>                                   |
| Jewett John C. & Sons, Buffalo, N. Y.                | Jewett John C. & Sons, Buffalo, N. Y.                |
| Sidney Shepley & Co., Buffalo, N. Y.                 | Sidney Shepley & Co., Buffalo, N. Y.                 |
| <b>Coal Hods, Manufacturers of.</b>                  | <b>Coal Hods, Manufacturers of.</b>                  |
| Eastern Iron Works, 311 Cherry, Phila.               | Eastern Iron Works, 311 Cherry, Phila.               |
| Jewett John C. & Sons, Buffalo, N. Y.                | Jewett John C. & Sons, Buffalo, N. Y.                |
| <b>Coffee and Spice Mills.</b>                       | <b>Coffee and Spice Mills.</b>                       |
| Lane Brothers, Millbrook, N. Y.                      | Lane Brothers, Millbrook, N. Y.                      |
| <b>Compass and Dividers.</b>                         | <b>Compass and Dividers.</b>                         |
| Benjamin & Call Hard. & Tool Co., Springfield, Mass. | Benjamin & Call Hard. & Tool Co., Springfield, Mass. |
| <b>Compound.</b>                                     | <b>Compound.</b>                                     |
| Horrobbell Chas., 56 Broadway, N. Y.                 | Horrobbell Chas., 56 Broadway, N. Y.                 |
| <b>Cooper's Tools, etc., Dealers in.</b>             | <b>Cooper's Tools, etc., Dealers in.</b>             |
| D. R. Barton Tool Co., Rochester, N. Y.              | D. R. Barton Tool Co., Rochester, N. Y.              |
| Little Chas. E., 59 Fulton, N. Y.                    | Little Chas. E., 59 Fulton, N. Y.                    |
| <b>Corn Huskers.</b>                                 | <b>Corn Huskers.</b>                                 |
| Chambers & Quinlan, Decatur, Ill.                    | Chambers & Quinlan, Decatur, Ill.                    |
| <b>Corrugated Iron.</b>                              | <b>Corrugated Iron.</b>                              |
| Mosley Iron Bridge and Roof Co., 5 Day, N. Y.        | Mosley Iron Bridge and Roof Co., 5 Day, N. Y.        |
| <b>Cotton Gin Feeders, Manufacturers of.</b>         | <b>Cotton Gin Feeders, Manufacturers of.</b>         |
| The Brown Cotton Gin Co., New London, Conn.          | The Brown Cotton Gin Co., New London, Conn.          |
| <b>Cranes, Manufacturers of.</b>                     | <b>Cranes, Manufacturers of.</b>                     |
| Stow, Wile & Co., 70 Marks, Phila.                   | Stow, Wile & Co., 70 Marks, Phila.                   |
| <b>Cranes and Lifting Machines.</b>                  | <b>Cranes and Lifting Machines.</b>                  |
| Greene Levi R., Boston, Mass.                        | Greene Levi R., Boston, Mass.                        |
| <b>Curry Combs, Manufacturers of.</b>                | <b>Curry Combs, Manufacturers of.</b>                |
| Cassell I. N., Fredericktown, O.                     | Cassell I. N., Fredericktown, O.                     |
| Fauer Brothers, 30 Chambers St., N. Y.               | Fauer Brothers, 30 Chambers St., N. Y.               |
| Hotchkiss' Sons, Bridgeport, Conn.                   | Hotchkiss' Sons, Bridgeport, Conn.                   |
| Lawrence Curry Comb Co., 353 3d Avenue, N. Y.        | Lawrence Curry Comb Co., 353 3d Avenue, N. Y.        |
| <b>Curry Combs, Importers of.</b>                    | <b>Curry Combs, Importers of.</b>                    |
| Baker Hermann & Co., 101 Duane, N. Y.                | Baker Hermann & Co., 101 Duane, N. Y.                |
| Clatworthy F. & Co., Buffalo, N. Y.                  | Clatworthy F. & Co., Buffalo, N. Y.                  |
| Frederic F. W. John, N. Y.                           | Frederic F. W. John, N. Y.                           |
| Friedman & Lutterling, 14 Warren, N. Y.              | Friedman & Lutterling, 14 Warren, N. Y.              |
| Emm. Briggs & Co., 23 Chambers, N. Y.                | Emm. Briggs & Co., 23 Chambers, N. Y.                |
| Man Emanuel, 106 Chambers, N. Y.                     | Man Emanuel, 106 Chambers, N. Y.                     |
| Rogers & Bro., 213 Broadway, N. Y.                   | Rogers & Bro., 213 Broadway, N. Y.                   |
| Waldron, 124 Chambers, N. Y.                         | Waldron, 124 Chambers, N. Y.                         |
| Wilson Hawkworth, 23 John, N. Y.                     | Wilson Hawkworth, 23 John, N. Y.                     |
| <b>Cutlery, Manufacturers of.</b>                    | <b>Cutlery, Manufacturers of.</b>                    |
| Barnhart Aaron, Pennock, Mass.                       | Barnhart Aaron, Pennock, Mass.                       |
| Lamson & Goodnow Mfg. Co., 53 Chambers, N. Y.        | Lamson & Goodnow Mfg. Co., 53 Chambers, N. Y.        |
| Miller Bros. Cutlery Co., W. Meriden, Conn.          | Miller Bros. Cutlery Co., W. Meriden, Conn.          |
| Natungcut Cutlery Co., 38 Chambers, N. Y.            | Natungcut Cutlery Co., 38 Chambers, N. Y.            |
| New York Knife Co., Valden, N. Y.                    | New York Knife Co., Valden, N. Y.                    |
| <b>Door Alarm, Makers of.</b>                        | <b>Door Alarm, Makers of.</b>                        |
| Baker, 3425 Market, Philadelphia.                    | Baker, 3425 Market, Philadelphia.                    |
| <b>Door and Gate Saws.</b>                           | <b>Door and Gate Saws.</b>                           |
| Quackenbush, Townsend & Co., 50 Reade, N. Y.         | Quackenbush, Townsend & Co., 50 Reade, N. Y.         |
| Van Wagoner & Williams, 32 Beekman, N. Y.            | Van Wagoner & Williams, 32 Beekman, N. Y.            |
| <b>Door Knobs, Manufacturers of.</b>                 | <b>Door Knobs, Manufacturers of.</b>                 |
| Ornamental Wood Co., Bridgeport, Conn.               | Ornamental Wood Co., Bridgeport, Conn.               |
| The Parker & Whipple Co., 91 Chambers, N. Y.         | The Parker & Whipple Co., 91 Chambers, N. Y.         |
| <b>Drawing Instruments.</b>                          | <b>Drawing Instruments.</b>                          |
| The Hartford Curve Scriber Co., 251 Broadway, N. Y.  | The Hartford Curve Scriber Co., 251 Broadway, N. Y.  |
| <b>Dredging and Makers of Dredging Machines.</b>     | <b>Dredging and Makers of Dredging Machines.</b>     |
| Am. Dredging & Machine Co., Delaware Ave., Phila.    | Am. Dredging & Machine Co., Delaware Ave., Phila.    |
| <b>Drill Chisels, Manufacturers of.</b>              | <b>Drill Chisels, Manufacturers of.</b>              |
| Fraser & Co., 41 Chatham, N. Y.                      | Fraser & Co., 41 Chatham, N. Y.                      |
| Lambertville Iron Works, Lambertville, N. J.         | Lambertville Iron Works, Lambertville, N. J.         |
| <b>Drilling Machines, Makers of.</b>                 | <b>Drilling Machines, Makers of.</b>                 |
| Thorne, DeHaven & Co., Philadelphia.                 | Thorne, DeHaven & Co., Philadelphia.                 |
| <b>Dron Forgings.</b>                                | <b>Dron Forgings.</b>                                |
| Holmes & Spencer Co., Hartford, Conn.                | Holmes & Spencer Co., Hartford, Conn.                |
| Ricker Hermann & Co., 101 and 103 Duane, N. Y.       | Ricker Hermann & Co., 101 and 103 Duane, N. Y.       |
| Hammond H. & Co., Hartford, Conn.                    | Hammond H. & Co., Hartford, Conn.                    |
| The Hull & Helden Co., Danbury, Conn.                | The Hull & Helden Co., Danbury, Conn.                |
| <b>Edge Tools, Makers of.</b>                        | <b>Edge Tools, Makers of.</b>                        |
| The H. B. Barton Tool Co., Rochester, N. Y.          | The H. B. Barton Tool Co., Rochester, N. Y.          |
| Wood N. & Gold, N. Y.                                | Wood N. & Gold, N. Y.                                |
| <b>Electric Machines.</b>                            | <b>Electric Machines.</b>                            |
| Chambers, 124 William, N. Y.                         | Chambers, 124 William, N. Y.                         |
| <b>Elevators, Makers of.</b>                         | <b>Elevators, Makers of.</b>                         |
| Crane Bros. Mfg. Co., Chicago, Ill.                  | Crane Bros. Mfg. Co., Chicago, Ill.                  |
| Holmes Machine Co., 23 Chambers, N. Y.               | Holmes Machine Co., 23 Chambers, N. Y.               |
| Whitaker Machine Co., 1178 Tremont, Boston, Mass.    | Whitaker Machine Co., 1178 Tremont, Boston, Mass.    |
| <b>Emery.</b>  | <b>Emery.</b>  |
| Geo. H. Gray & Danforth, Boston, Mass.               | Geo. H. Gray & Danforth, Boston, Mass.               |
| <b>Emery Wheels, Makers of.</b>                      | <b>Emery Wheels, Makers of.</b>                      |
| Brady Mfg. Co., 280 Plymouth, Brooklyn, N. Y.        | Brady Mfg. Co., 280 Plymouth, Brooklyn, N. Y.        |
| The Union Stone Co., 18 Exchange, Boston.            | The Union Stone Co., 18 Exchange, Boston.            |
| <b>Enamel Plates.</b>                                | <b>Enamel Plates.</b>                                |
| Leffers Enamel Works, 417 W. 24, N. Y.               | Leffers Enamel Works, 417 W. 24, N. Y.               |
| <b>Engineers, Manufacturers of.</b>                  | <b>Engineers, Manufacturers of.</b>                  |
| Hessell James, 106 Beach, Phila.                     | Hessell James, 106 Beach, Phila.                     |
| Moore James, 231 10th and Buttonwood, Phila.         | Moore James, 231 10th and Buttonwood, Phila.         |
| Ohi & Haenschel, 51 to 61 Passaic Ave., Newark,      | Ohi & Haenschel, 51 to 61 Passaic Ave., Newark,      |
| N. J.  | N. J.  |
| <b>Engraving, Sheet, Manufacturers of.</b>           | <b>Engraving, Sheet, Manufacturers of.</b>           |
| Ervin Chas. W. & Bro., Kensington, Phila.            | Ervin Chas. W. & Bro., Kensington, Phila.            |
| Hartford Foundry and Machine Co., Hartford, Ct.      | Hartford Foundry and Machine Co., Hartford, Ct.      |
| Lovregrove & Co., 121 South 4th, Phila.              | Lovregrove & Co., 121 South 4th, Phila.              |
| Farne B. W. & Sons, Corning, N. Y.                   | Farne B. W. & Sons, Corning, N. Y.                   |
| Shapley & Wells, Huntington, N. Y.                   | Shapley & Wells, Huntington, N. Y.                   |
| <b>Engravers.</b>                                    | <b>Engravers.</b>                                    |
| Collins Geo. R. 10 Warren, N. Y.                     | Collins Geo. R. 10 Warren, N. Y.                     |
| Winston A. & Co., Hartford, Conn.                    | Winston A. & Co., Hartford, Conn.                    |
| <b>Engraving, Brass, Makers of.</b>                  | <b>Engraving, Brass, Makers of.</b>                  |
| Mosley & Harris Mfg. Co., 36 John, N. Y.             | Mosley & Harris Mfg. Co., 36 John, N. Y.             |

|   |   |
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| <b>Engraving, Self-Measuring, Makers of.</b>    | <b>Engraving, Self-Measuring, Makers of.</b>    |
| Engraving Mfg. Co., of Pa., Philadelphia, N. Y. | Engraving Mfg. Co., of Pa., Philadelphia, N. Y. |
| <b>Files, Importers of.</b>                     | <b>Files, Importers of.</b>                     |
| Clark J. & Riley, 32 John, N. Y.                | Clark J. & Riley, 32 John, N. Y.                |
| Fisher Joseph S., 41 Commerce, Phila.           | Fisher Joseph S., 41 Commerce, Phila.           |
| Fraser F. A. & Co., Fulton, N. Y.               | Fraser F. A. & Co., Fulton, N. Y.               |
| Moss F. W. 80 John, N. Y.                       | Moss F. W. 80 John, N. Y.                       |
| Sanderson Bros. & Co., 16 Cliff, N. Y.          | Sanderson Bros. & Co., 16 Cliff, N. Y.          |
| Seeger & Jackson, 59 Chambers, N. Y.            | Seeger & Jackson, 59 Chambers, N. Y.            |
| <b>Files, Manufacturers of.</b>                 | <b>Files, Manufacturers of.</b>                 |
| Adamantine File Works, Providence, R. I.        | Adamantine File Works, Providence, R. I.        |
| American File Co., Pawtucket, R. I.             | American File Co., Pawtucket, R. I.             |
| Anniston File Works, 25 Chambers, N. Y.         | Anniston File Works, 25 Chambers, N. Y.         |
| Barnett G. & H. A. 100 Richmond, Phila.         | Barnett G. & H. A. 100 Richmond, Phila.         |
| Diston Henry & Sons, Phila.                     | Diston Henry & Sons, Phila.                     |
| Draper C. & Co., Sing Sing, N. Y.               | Draper C. & Co., Sing Sing, N. Y.               |
| Heller & Bros., Newark, N. Y.                   | Heller & Bros., Newark, N. Y.                   |
| Hiscox File Mfg. Co., West Chelsea, Mass.       | Hiscox File Mfg. Co., West Chelsea, Mass.       |
| Johnson & Bro., 1 Commercial, Newark, N. J.     | Johnson & Bro., 1 Commercial, Newark, N. J.     |
| McCaffrey & Bro., 132 and 134 4th, Phila.       | McCaffrey & Bro., 132 and 134 4th, Phila.       |
| Nicholson File Co., Providence, R. I.           | Nicholson File Co., Providence, R. I.           |
| Paul Chas. E., Williamsburgh, N. Y.             | Paul Chas. E., Williamsburgh, N. Y.             |
| <b>Fire Stricks, Makers of.</b>                 | <b>Fire Stricks, Makers of.</b>                 |
| Ames Chas. & Sons, Woodbridge, N. J.            | Ames Chas. & Sons, Woodbridge, N. J.            |
| Berry Wm. H. & Co., Woodbridge, N. J.           | Berry Wm. H. & Co., Woodbridge, N. J.           |
| Brooklyn Clay Retort and Fire Brick Works, Van  | Brooklyn Clay Retort and Fire Brick Works, Van  |
| Dyke St., Brooklyn, N. Y.                       | Dyke St., Brooklyn, N. Y.                       |
| Hall A. & Sons, Buffalo, N. Y.                  | Hall A. & Sons, Buffalo, N. Y.                  |
| Maurer Henry, 418 East 23d, N. Y.               | Maurer Henry, 418 East 23d, N. Y.               |
| Kreuscher & Son, 45 George, N. Y.               | Kreuscher & Son, 45 George, N. Y.               |
| Newkumet Philip, 2nd and Vine, Phila.           | Newkumet Philip, 2nd and Vine, Phila.           |
| Newton & Co., Albany, N. Y.                     | Newton & Co., Albany, N. Y.                     |
| Valentine D. & Bro., Woodbridge, N. J.          | Valentine D. & Bro., Woodbridge, N. J.          |
| Watson John R., Perth Amboy, N. J.              | Watson John R., Perth Amboy, N. J.              |
| Webster Adam, 163 E. 15th, N. Y.                | Webster Adam, 163 E. 15th, N. Y.                |
| Woodland, Fire Brick Works, Woodbridge, N. J.   | Woodland, Fire Brick Works, Woodbridge, N. J.   |
| <b>Flat and Emery Paper and Cloth.</b>          | <b>Flat and Emery Paper and Cloth.</b>          |
| Leffers Adamson & Co., 730 Market, Phila.       | Leffers Adamson & Co., 730 Market, Phila.       |
| <b>Flashing, Tack, Makers of.</b>               | <b>Flashing, Tack, Makers of.</b>               |
| Shipley A. B. & Son, 58 Commerce, Phila.        | Shipley A. B. & Son, 58 Commerce, Phila.        |
| <b>Flue Cleaners, Makers of.</b>                | <b>Flue Cleaners, Makers of.</b>                |
| The Chalmers Space Co., Foot of E. 9th, N. Y.   | The Chalmers Space Co., Foot of E. 9th, N. Y.   |
| <b>Fluting Machines.</b>                        | <b>Fluting Machines.</b>                        |
| The American Machine Co., 430 Walnut, Phila.    | The American Machine Co., 430 Walnut, Phila.    |
| <b>Forges, Portable, etc.</b>                   | <b>Forges, Portable, etc.</b>                   |
| Keystone Portable Forge Co., Philadelphia.      | Keystone Portable Forge Co., Philadelphia.      |
| George (Hurricane) 121 Chambers, N. Y.          | George (Hurricane) 121 Chambers, N. Y.          |
| Sam J. Crowell Jr., 32 Race, Phila.             | Sam J. Crowell Jr., 32 Race, Phila.             |
| <b>Foundry Facings.</b>                         | <b>Foundry Facings.</b>                         |
| Cutler & Brown, 285 Cherry, N. Y.               | Cutler & Brown, 285 Cherry, N. Y.               |
| Paxson J. W. & Co., 114 Beach, Phila.           | Paxson J. W. & Co., 114 Beach, Phila.           |
| Whitehead Bros., 517 W. 15th, N. Y.             | Whitehead Bros., 517 W. 15th, N. Y.             |
| <b>Fract. Cast Trimmings.</b>                   | <b>Fract. Cast Trimmings.</b>                   |
| Paterson J. M., Woodbury, N. J.                 | Paterson J. M., Woodbury, N. J.                 |
| <b>Furnaces, Makers of.</b>                     | <b>Furnaces, Makers of.</b>                     |
| Richmond & Potts, 115 S. Fourth, Phila.         | Richmond & Potts, 115 S. Fourth, Phila.         |
| <b>Generalized Iron.</b>                        | <b>Generalized Iron.</b>                        |
| Leffers Marshall Jr., 90 Beekman, N. Y.         | Leffers Marshall Jr., 90 Beekman, N. Y.         |
| Lois Galvanizing Works.                         | Lois Galvanizing Works.                         |
| <b>Gang Belts, Makers of.</b>                   | <b>Gang Belts, Makers of.</b>                   |
| Edw. Sweeney, 4 Duane, N. Y.                    | Edw. Sweeney, 4 Duane, N. Y.                    |
| <b>Governors.</b>                               | <b>Governors.</b>                               |
| Junius Judson & Son, Rochester, N. Y.           | Junius Judson & Son, Rochester, N. Y.           |



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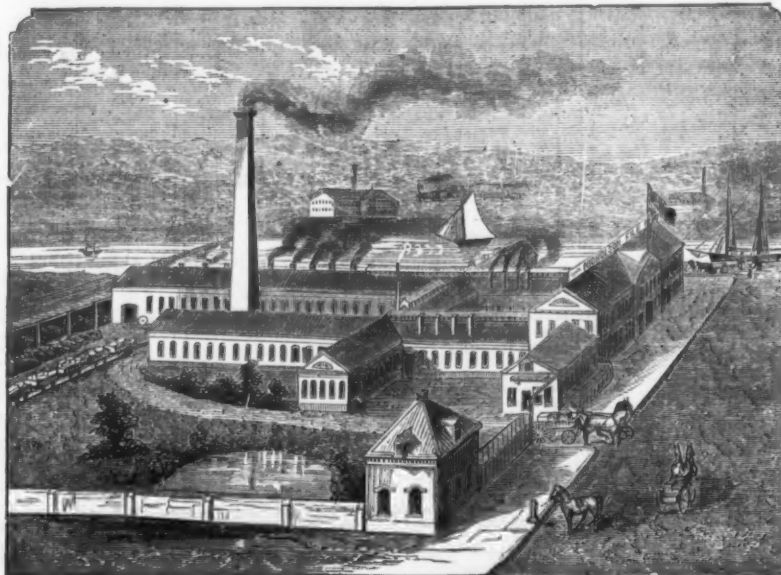
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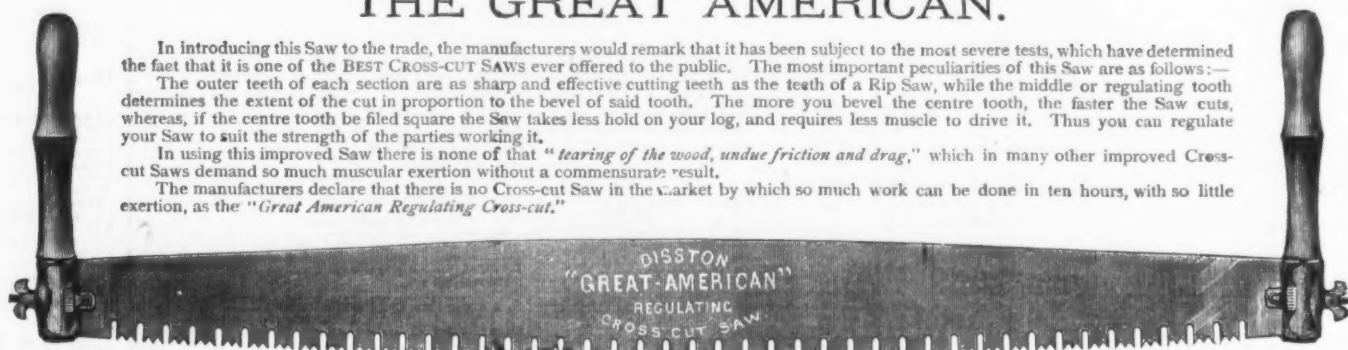
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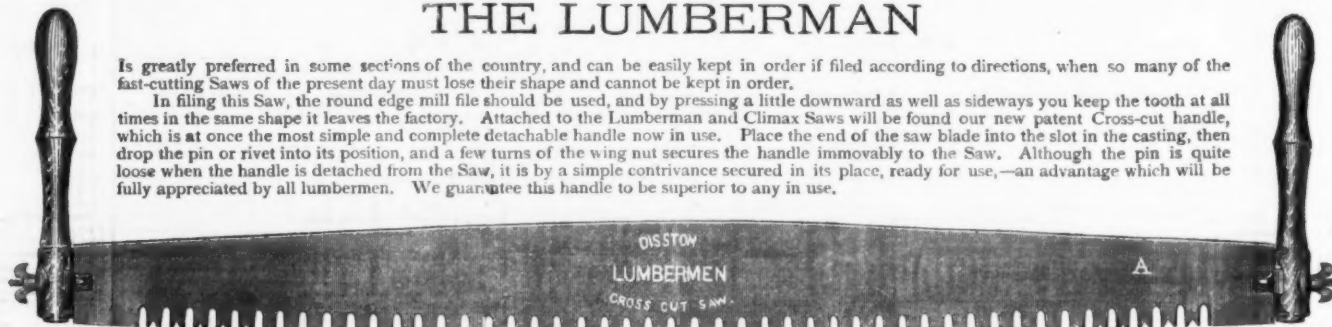
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In introducing this Saw to the trade, the manufacturers would remark that it has been subject to the most severe tests, which have determined the fact that it is one of the BEST CROSS-CUT SAWS ever offered to the public. The most important peculiarities of this Saw are as follows:—  
The outer teeth of each section are as sharp and effective cutting teeth as the teeth of a Rip Saw, while the middle or regulating tooth determines the extent of the cut in proportion to the bevel of said tooth. The more you bevel the centre tooth, the faster the Saw cuts, whereas, if the centre tooth be filed square the Saw takes less hold on your log, and requires less muscle to drive it. Thus you can regulate your Saw to suit the strength of the parties working it.  
In using this improved Saw there is none of that "tearing of the wood, undue friction and drag," which in many other improved Cross-cut Saws demand so much muscular exertion without a commensurate result.  
The manufacturers declare that there is no Cross-cut Saw in the market by which so much work can be done in ten hours, with so little exertion, as the "Great American Regulating Cross-cut."



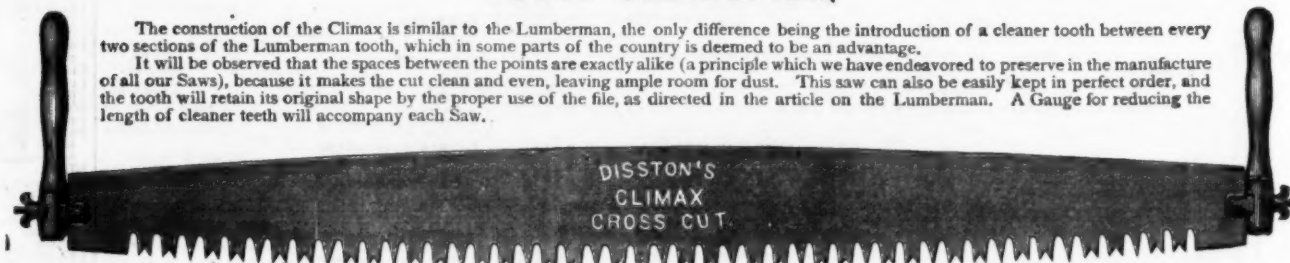
### THE LUMBERMAN

Is greatly preferred in some sections of the country, and can be easily kept in order if filed according to directions, when so many of the fast-cutting Saws of the present day must lose their shape and cannot be kept in order.  
In filing this Saw, the round edge mill file should be used, and by pressing a little downward as well as sideways you keep the tooth at all times in the same shape it leaves the factory. Attached to the Lumberman and Climax Saws will be found our new patent Cross-cut handle, which is at once the most simple and complete detachable handle now in use. Place the end of the saw blade into the slot in the casting, then drop the pin or rivet into its position, and a few turns of the wing nut secures the handle immovably to the Saw. Although the pin is quite loose when the handle is detached from the Saw, it is by a simple contrivance secured in its place, ready for use,—an advantage which will be fully appreciated by all lumbermen. We guarantee this handle to be superior to any in use.



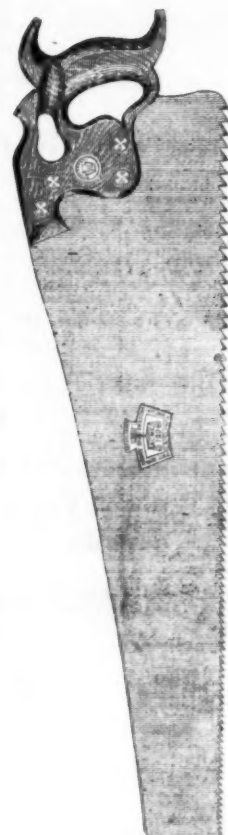
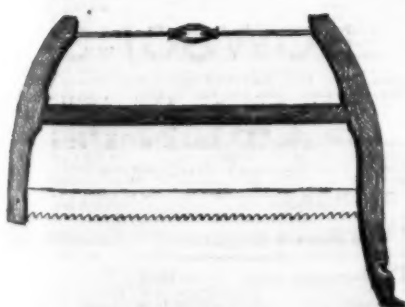
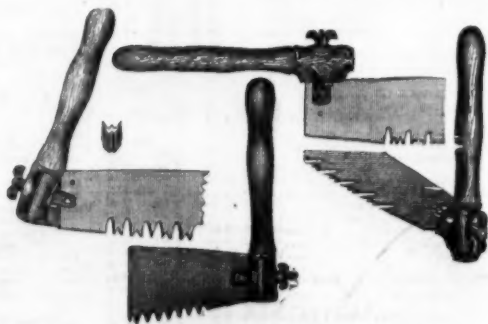
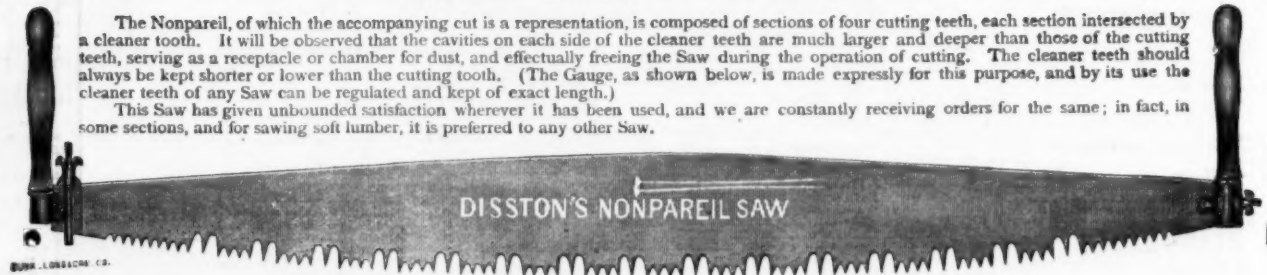
### THE CLIMAX.

The construction of the Climax is similar to the Lumberman, the only difference being the introduction of a cleaner tooth between every two sections of the Lumberman tooth, which in some parts of the country is deemed to be an advantage.  
It will be observed that the spaces between the points are exactly alike (a principle which we have endeavored to preserve in the manufacture of all our Saws), because it makes the cut clean and even, leaving ample room for dust. This saw can also be easily kept in perfect order, and the tooth will retain its original shape by the proper use of the file, as directed in the article on the Lumberman. A Gauge for reducing the length of cleaner teeth will accompany each Saw.



### THE NONPAREIL.

The Nonpareil, of which the accompanying cut is a representation, is composed of sections of four cutting teeth, each section intersected by a cleaner tooth. It will be observed that the cavities on each side of the cleaner teeth are much larger and deeper than those of the cutting teeth, serving as a receptacle or chamber for dust, and effectually freeing the Saw during the operation of cutting. The cleaner teeth should always be kept shorter or lower than the cutting tooth. (The Gauge, as shown below, is made expressly for this purpose, and by its use the cleaner teeth of any Saw can be regulated and kept of exact length.)  
This Saw has given unbounded satisfaction wherever it has been used, and we are constantly receiving orders for the same; in fact, in some sections, and for sawing soft lumber, it is preferred to any other Saw.





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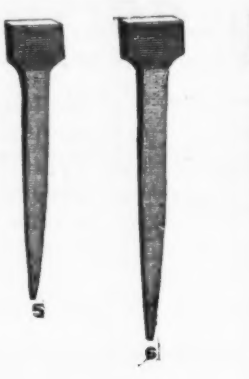


### ZINC TUBING.

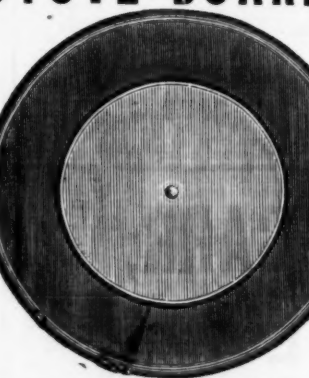
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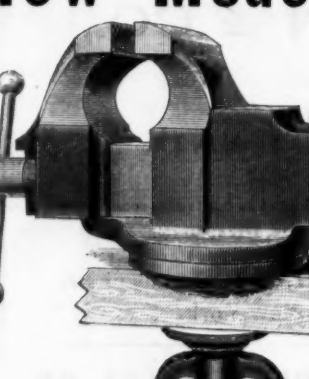
Rose Pink..... 16 00  
Sienna American, raw..... 16 00  
    "    Burlt..... 16 00  
    "    Raw..... 15 00  
Umber, Burlt..... 4 00  
    "    Raw..... 4 00  
    "    In oil..... 16 00  
    "    In oil..... 15 00  
Vermillion, Chinese..... 2 50  
    "    English..... 1 10  
    "    Trieste..... 1 10  
White Lead, American, pure dry..... 10 00  
    "    "    In oil..... 10 00  
White, Paris, English, prime..... 1 15  
Yellow Ochre, French..... 2 50  
    "    In oil..... 11c kegs  
    "    Vermont..... 17 00  
Yellow Chrome..... 18 00  
Zinc White, American No. 1 dry..... 10 00  
    "    French (Paris)..... 10 00  
    "    In oil..... 10 00  
Linseed Raw..... 7 gal. casks, 50c. bbl.,  
    "    Polled..... 62c. " "  
    "    Bleached Water..... 0bl.  
Sperm..... 0bl.  
    "    Bleached..... 0bl.  
Seal, Extra Refined..... 0bl.  
Lard, Pure Winter..... 0bl.  
    "    Spring..... 0bl.  
Cotton Seed, Crude..... 0bl.  
    "    Southern Yellow..... 0bl.  
Nestsfoot, Winter..... 70c  
Natural Lubricating..... 80c  
    "    Summer..... 80c  
Asphaltum..... 7 gal.  
Benzine..... 7 gal.  
Chalk..... 0bl.  
    "    Block..... 10c  
Dryer, Patent, Am'n..... 10c  
    "    English..... 10c  
Flocks..... 10c  
Frostings..... 10c  
Glue, White..... 10c  
    "    Sheet..... 10c  
Glaziers' Points, Zinc..... 10c

**PRATT**  
**Hardware & Iron M**  
Manufacturers  
**BUFFALO FORG**  
These Nails are superior, being made with new and  
best brands of **Norway Iron**.



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**G. B. WALBRIDGE**

**Brooks**  
**STOVE BOARDS**  
  
**ROUND, SQUARE**  
**Three Shapes.**  
These Stove Boards being made of three different  
**NOT TAKE FIRE**, or allow carpets and floor  
zinc and wood frequently do. Address the manuf  
**SIDNEY SHEPARD**  
Please send for Illustrated Price Lists.

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Our Vises are warranted to do more work than  
**PHILIPS**  
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**AMERICAN**  
95 Reade & 113 Ch  
Coxs & Taft's Pat. Wrenches.  
Axe Pick, Sledge & Hammer  
Bands.  
C. A. Wellman & Co., Glimmers  
and Glimmer Bita.  
Angers and Anger Bita.  
Belroyd's  
E. C. Malth  
Briagun  
Patent Tap  
Certandt B

Gunn, Copal..... \$6  
" "Damar..... 50  
" "Shellac, English..... 50  
" "dark..... 50  
Gdnarge..... 34  
Pumice Stone, selected Lump..... 4 @ 50  
Putty in bladder..... 14  
in bulk..... 14  
Rotten Stone, soft, English..... 8c  
Spirite Turpentine..... 8c  
Whiting, Spanish..... 4

**Glass.**

FRENCH WINDOW GLASS.  
*Pieces current per box of 50 feet.*

Single Thick.

| SIZES.                  | 1st.    | 2d.     | 3d.     | 4th.    |
|-------------------------|---------|---------|---------|---------|
| 6 x 8 to 10 x 15.....   | \$ 7-50 | \$ 6-75 | \$ 6-25 | \$ 5-75 |
| 11 x 14 to 16 x 34..... | 8-90    | 7-75    | 7-25    | 6-10    |
| 15 x 22 to 20 x 30..... | 10-75   | 9-75    | 8-75    | 7-75    |
| 15 x 36 to 21 x 30..... | 12-25   | 10-75   | 9-00    |         |
| 15 x 28 to 24 x 30..... | 13-00   | 11-50   | 9-75    |         |
| 20 x 36 to 26 x 44..... | 14-50   | 13-25   | 10-75   |         |
| 20 x 46 to 30 x 50..... | 15-00   | 14-00   | 11-25   |         |
| 30 x 57 to 30 x 54..... | 16-00   | 14-50   | 12-00   |         |
| 30 x 56 to 34 x 6.....  | 17-25   | 15-50   | 13-50   |         |
| 34 x 58 to 34 x 60..... | 18-25   | 17-25   | 15-00   |         |
| 36 x 60 to 40 x 60..... | 20-75   | 18-75   | 17-25   |         |

Double Thick.

| SIZES.                  | 1st.    | 2d.     | 3d.     | 4th.    |
|-------------------------|---------|---------|---------|---------|
| 6 x 8 to 10 x 15.....   | \$12-00 | \$11-00 | \$10-00 | \$ 9-25 |
| 11 x 14 to 16 x 34..... | 13-75   | 12-50   | 11-75   | 10-50   |
| 15 x 22 to 20 x 30..... | 17-25   | 15-75   | 14-00   |         |
| 15 x 36 to 21 x 30..... | 19-75   | 17-25   | 14-50   |         |
| 15 x 28 to 24 x 30..... | 21-00   | 18-50   | 15-75   |         |
| 20 x 36 to 26 x 44..... | 23-25   | 21-25   | 17-25   |         |
| 20 x 46 to 30 x 50..... | 24-00   | 22-50   | 18-00   |         |
| 30 x 57 to 30 x 54..... | 26-75   | 23-25   | 19-25   |         |
| 30 x 56 to 34 x 6.....  | 27-75   | 25-00   | 21-75   |         |
| 34 x 58 to 34 x 60..... | 29-25   | 27-75   | 24-00   |         |
| 36 x 60 to 40 x 60..... | 32-25   | 30-00   | 27-25   |         |

Sizes above 40 x 60—\$10-00 per box extra for every five inches.

An additional 10 per cent. will be charged for all Glass more than 40 inches wide. All sires above 54 inches "n length, and not making more than 61 united inches, will be charged in the 84 united inches orrackt.

Discount 5@15 @ 5@20 %.

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Merchants, Buffalo, N. Y.  
of the Superior Brand,  
**ED HORSE NAILS.**  
improved machinery and actually hammered from the very

ade.  
& CO., New York Agents.

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OR PLATFORMS.

ARE, OBLONG.  
Twenty-Six Sizes.

ent materials, all non-conductors of heat, WILL  
to burn, as those constructed of only one thickness of  
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**& CO., Buffalo, N. Y.**

**Swivel Vise.**

The advantage claimed for this Vise over the ordinary patterns is in the ease with which it is adjusted to whatever angle may be required.

**Trenton Vise & Tool Works,**  
TRENTON, N. J.,  
Manufacturers of  
Solid Box Vises, Hammers, Sledges,  
Picks, Mattocks, Grub Hoes, &c.  
Warehouse,  
101 & 103 Duane St., NEW YORK.  
**HERMANN BOKER & CO.**  
any other make. No broken boxes or screws.

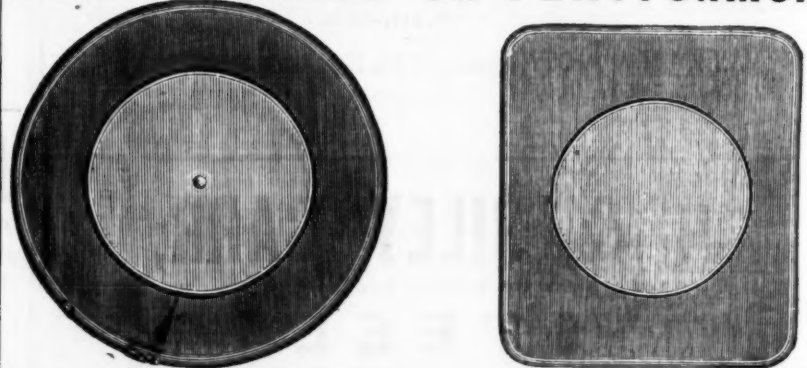
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SHATTUCK & CO.,  
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ocks & Dies.  
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Borg's  
Horse Nails.  
Eddy's Lamp Black.  
Shattuck's Platform Coun  
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Law's Cow Bell.  
Axes, Picks and Hatchets.

These Nails are superior, being made with new and improved machinery and actually hammered from the very best brands of **Norway Iron.**

**Orders solicited from the Trade.**

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Three Shapes, Twenty-Six Sizes.

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The advantage claimed for this Vise over the ordinary patterns is in the ease with which it is adjusted to whatever angle may be required.

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| C. C. Williams & Co., Gimlets<br>and Gimlet Bits.                   | Patent Horse Bolts.<br>Cortlandt Horse Nails.                            | Law's Cow Bells.<br>Axo, Picks and Hatchets.                   |
| Augers and Auger Bits.  |  |  |



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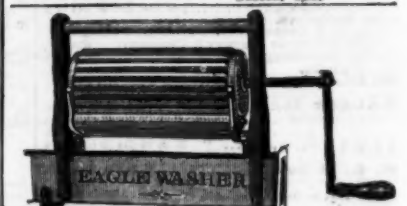
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ment "works like a  
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# "SUMMER QUEEN"

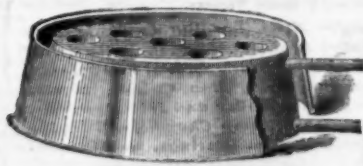
# Oil Cook Stove.

FOUR SIZES.

Suitable for all purposes, for Cooking, Baking and Ironing.

NON-EXPLOSIVE.

Centennial Water Heater.



Patented June 13, 1876.

The most practical invention for heating steam tables, wash boilers, bath tubs, &amp;c. Will be supplied with Leland's Pat. Couplings.

DEAR SIR: We beg to inform you that we are the Sole Patentees and Proprietors of the Patent Oil Cook Stove called the "SUMMER QUEEN," and will protect you in any sales you may be pleased to make for us against the threats, notices or molestations of any persons whatsoever.

Yours, truly,

C. RIESSNER &amp; CO.

## Hardware.

# SPEAR & JACKSON,

Sheffield, England.

MANUFACTURERS OF



# Saws, Files, Edge Tools & Steel.

JOHN L. FISHER, Agent,  
89 Chambers Street, NEW YORK.

# JOHN WILSON'S CELEBRATED

BUTCHERS' KNIVES,

BUTCHERS' STEELS,

AND SHOE KNIVES.

THE TRADE MARK, IN ADDITION TO THE NAME, IS STAMPED UPON EVERY ARTICLE MANUFACTURED BY JOHN WILSON.



GRANTED A.D. 1766, BY THE CORPORATION OF CUTLERS OF SHEFFIELD, AND PROTECTED BY ACT OF PARLIAMENT.

Works in SYCAMORE STREET, SHEFFIELD. ESTABLISHED in the Year 1750.

# HERMANN BOKER & CO.,

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SHEFFIELD (England), No. 3 Arundal Lane, Represented by Mr. ARTHUR LEE.

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# PATENT COMBINATION WRENCH.

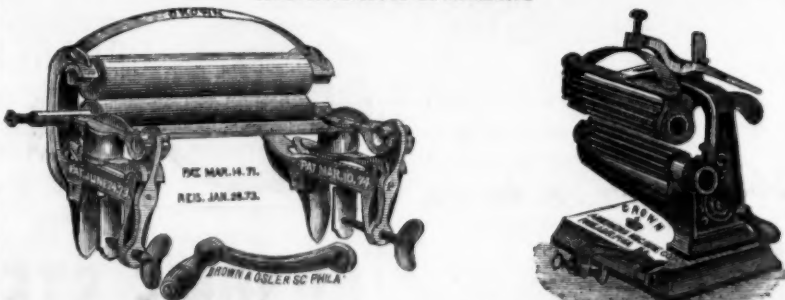
These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, Case-Jardened throughout, and not only combine all of the superior qualities of our cylinder or Gas Pipe Wrenches, but also all requisite combinations of a regular Nut Wrench, thus making a Combination which has no equal. For Circulars and Price List, address,

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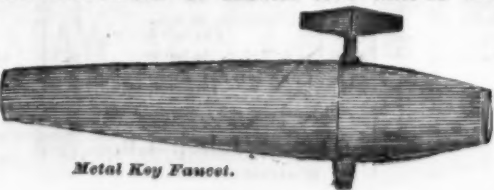
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The Buell Peg Float

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Little Giant Tack Puller.

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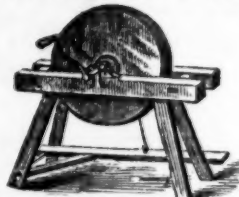
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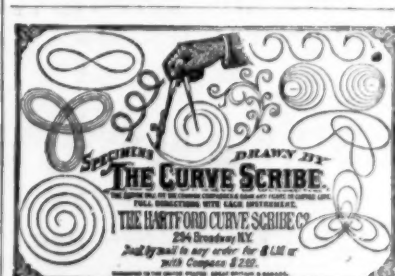
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BUTCHERS' MACHINES

Choppers, Hand and Power.

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Warranted thoroughly made and

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Patented Hardware Manufacturers and Iron Founders,

THREE IRONS AND ONE HANDLE TO A SET,  
Packed in 1/2 Doz. and 1 Doz. Cases.GEO. A. HAINES, AGT.,  
No. 113 Chambers Street, New York.**Mrs. Potts' Patent Sad-Irons,**  
(IMPROVED.)COFFEE, DRUG & SPICE MILLS, MEASURING FAUCETS,  
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FILES and HORSE RASPS.  
Rough & Ready  
And  
CLIPPER SCYTHES,  
Warranted.

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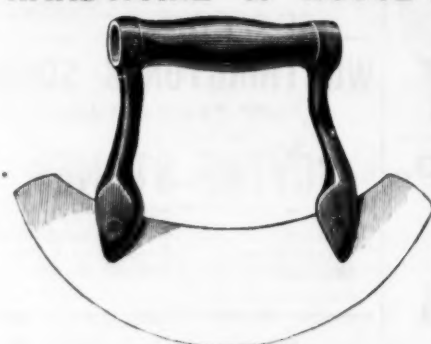
Agents for



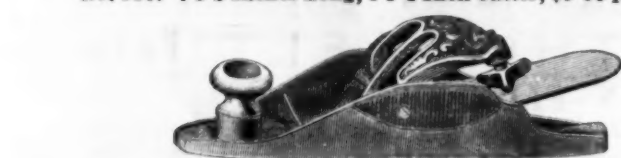
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American  
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"WIDE AWAKE"  
AXES.**The Cowles Hardware Co.,**  
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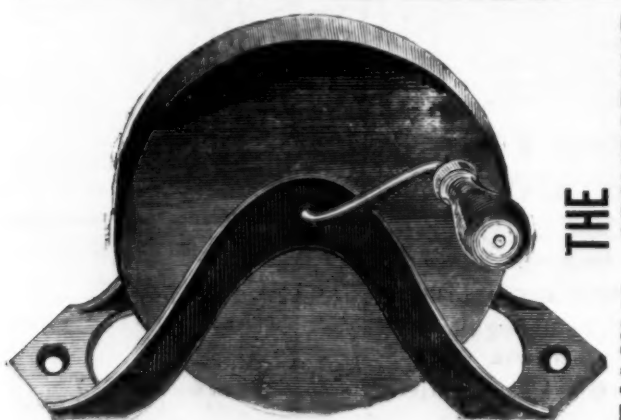
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Screw Drivers of all varieties, Box Scrapers, Box  
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Cheap as the Cheapest.  
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We are prepared to furnish these Screws at manufacturers' prices, either Bright or Annealed, and will  
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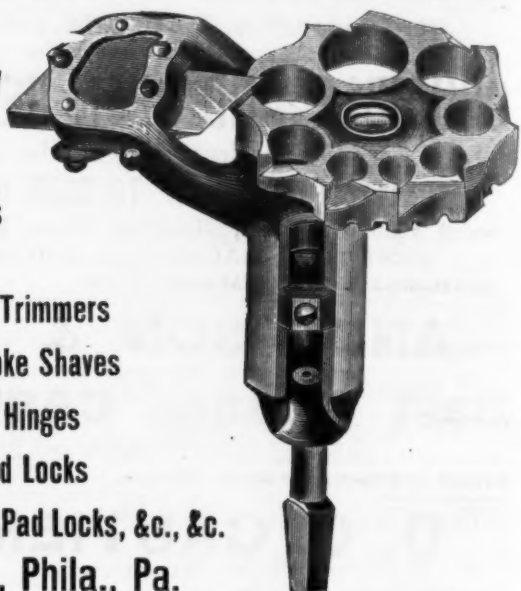
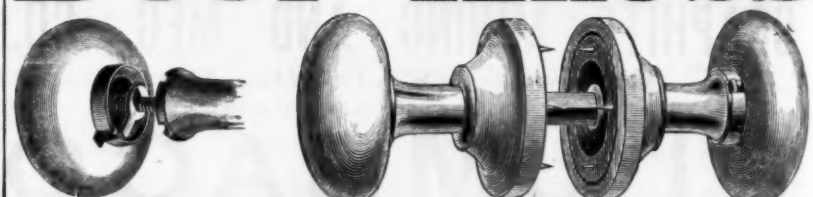
Double Edge Spoke Shaves

Adjustable Gate Hinges

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Door Knobs****THE WHIPPLE DOOR KNOB**  
Is the only perfect Door Knob Attachment ever invented.

AWARDED A BRONZE MEDAL

At the American Institute Fair, in New York, for 1874.

NO SCREWS USED IN NECK OR ROSES.

Adjusts Perfectly to Doors of Different Thicknesses

WITHOUT THE USE OF RINGS.

The attention of Architects, Builders and Carpenters is specially desired. Circu-  
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**SOLID BOX VISES.**

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Jackscrews, Braces, Coffee Mills, Turning Lathes, Clamp  
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Four Sizes, - - Nos. 25, 30, 40 and 50.

Two Sizes with Ovens, Nos. 30 and 40.

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ITS FIRST APPEARANCE.

All New Patterns made at our own Works.

It has many **Essential Features** entirely different from anything in the **Market**. Its general appearance is very attractive; its beauty of ornamentation is **unequaled**; its working-qualities, perfect; beside, its smoothness of castings, perfect fittings, burnished edges, full nickel-plated trimmings places it at the head of them all.

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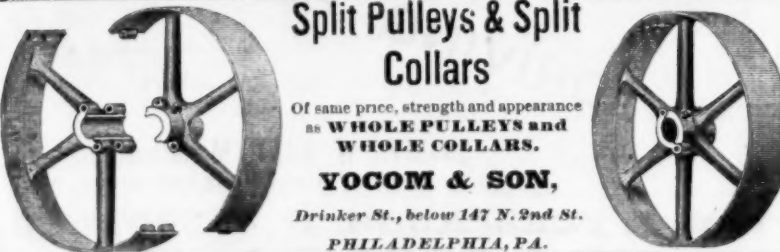
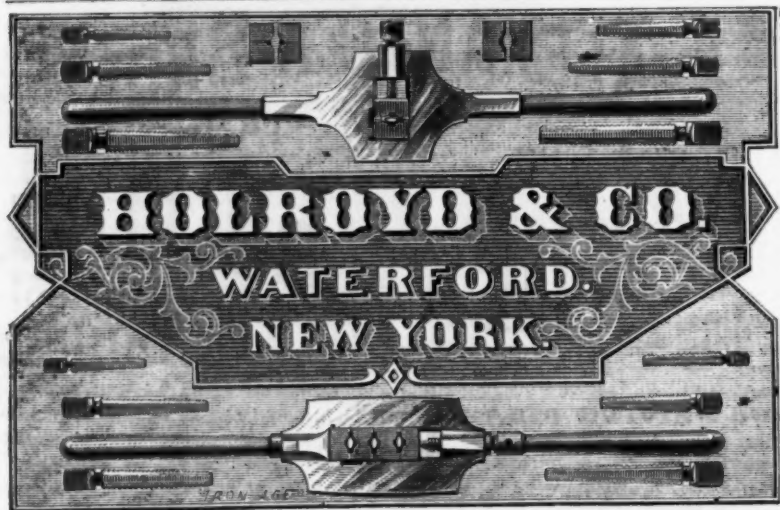
**Cooking, Parlor and Heating Stoves,**

unsurpassed by any in the market, as we use nothing but the best of **Lake Superior Charcoal** and other **First Class Brands of Iron**.

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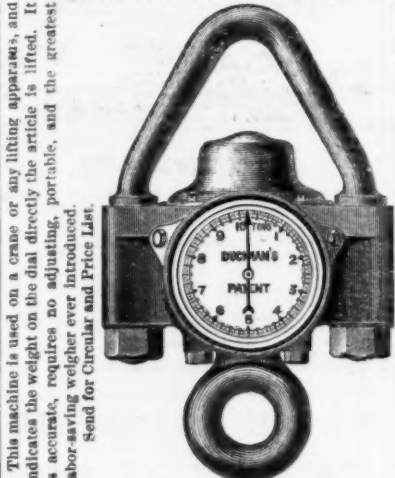
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Capacities from 1 to 100 tons.



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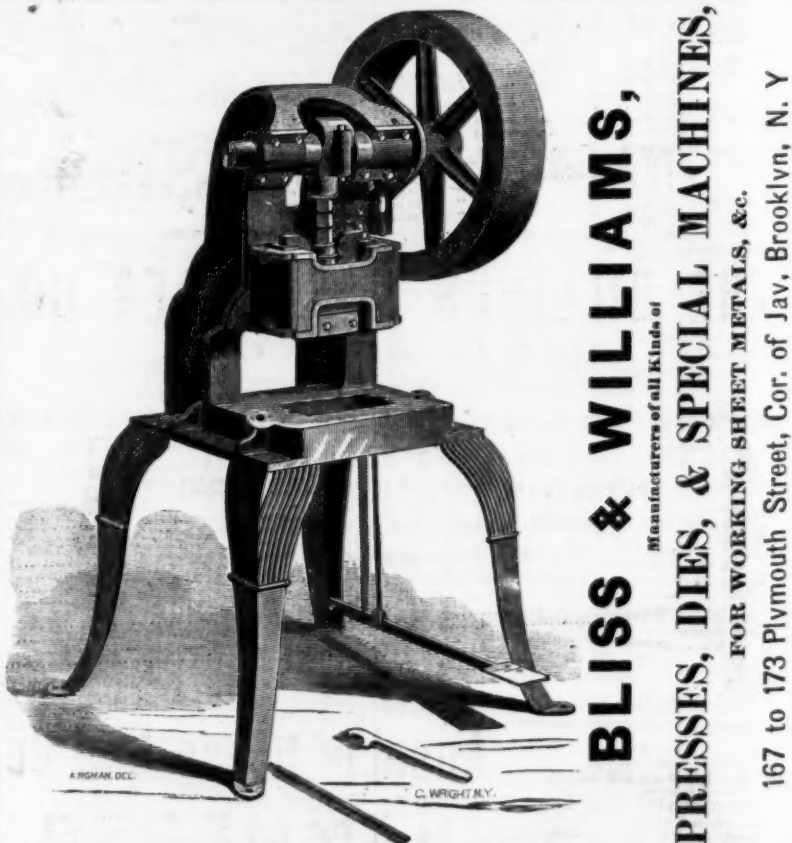
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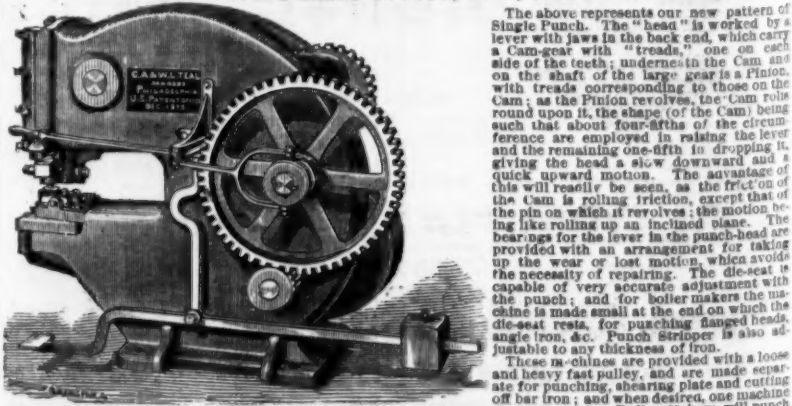
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SCALE AND TESTING WORKS  
ESTABLISHED 1842  
"Patented" Furnace Charging Scale.  
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**PRESSES, DIES, & SPECIAL MACHINES,**  
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**TEAL'S IMPROVED POWER PUNCH.**  
U. S. PATENT OFFICE, DEC., 1875.



The above represents our new pattern of Single Punch. The "head" is worked by a lever with jaws in the back end, which carry a Cam-gear with "treads," one on each side of the teeth; underneath in the Cam and on the shaft of the large gear is a Pinion, with treads corresponding to those on the Cam; as the Pinion revolves, the Cam rolls round upon it, the shape (of the Cam) being such that about four-fifths of the circumference are employed in raising the lever and the remaining one-fifth in dropping it, giving the head a slow downward and a quick upward motion. The advantage of this will readily be seen, as the friction of the Cam is rolling friction, except that of the pin on which it revolves; the motion being like rolling up an inclined plane. The bearings for the lever in the punch-head are provided with an arrangement for taking up the wear or lost motion, which avoids the necessity of repairing. The die-seat is capable of very accurate adjustment with the punch; and for boiler makers the machine is made small at the end on which the die-seat rests, for punching flanged heads, angle iron, &c. Punch Strippers is also adjustable to any thickness of iron. These machines are provided with a loose and heavy fast pulley, and are made separate for punching, shearing plate and cutting off bar iron; and when desired, one machine can be furnished with attachments for all three purposes. Our regular patterns for Boiler makers will punch 1 in. hole in 1 in. iron, shear 1 in. plate and cut off 1 1/2 in. bar iron, and will punch and shear in the center of 4 in. and 6 in. plate. Machines made to order for any kind of work, from the lightest to the heaviest.

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(Removed from 3029 Chestnut St.)  
P. O. Address, Station B, Philadelphia.  
**CENTENNIAL SPACE, NO. 5097, SECTION C, 3, MACHINERY HALL.**



**SOUTH BEND IRON WORKS.** South Bend, Ind.

**No. 1, 22 Calibre; No. 2, 32 Calibre, Long Cartridge.**



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**THE VICTOR PLANES**

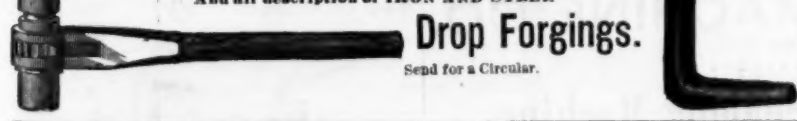
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Billings Patent Sewing Machine Shuttles, Marlin  
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And all description of IRON AND STEEL.



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Orders promptly filled at lowest market rates.

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Recommended by over **20,000** Horse Shoers.  
All nails made from best NORWAY IRON, and warranted perfect and  
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| Best Fine.....                     |         |                             | 18c       |
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| Antimony.....                      |         |                             | 22c       |
| Rabbit Metal—F. S. & Co. B.....    |         |                             | 15        |
| No. 2.....                         |         |                             | 14c       |
| <b>Sheet Iron.</b>                 |         |                             |           |
|                                    | Common. | Smooth.                     | Smooth    |
| No. 24.....                        | 3 1/2c  | Com.                        | Charcoal. |
| 25 to 30.....                      | 4 c     | 3 1/2c                      | Junata    |
| 31 to 36.....                      | 4 1/2c  | 4 c                         | 4 c       |
| 37.....                            | 4 1/2c  | 5 1/2c                      | 7 c       |
| Galvanized Iron.....               |         |                             | 9 1/2c    |
| 20 to 24.....                      | 13c     |                             |           |
| 25 to 28.....                      | 14c     |                             |           |
| 29 to 32.....                      | 15c     |                             |           |
| 33 to 36.....                      | 16c     |                             |           |
| Russian Iron.....                  |         | No. 1 Stained.....          | 15c       |
| Perfect.....                       | 16c     | In Sheets, i.e. higher..... | 16c       |
| American Russia.....               |         | B.....                      | 11c       |
| A.....                             | 13c     | In sheet, i.e. higher.....  | 14c       |
| Fig.....                           | 14c     | Lead Pig, when cut.....     | 9 1/2c    |
| Bar.....                           | 9 1/2c  | Sheet Lead.....             | 11c       |
| Wire.....                          |         |                             | 11c       |
| Coppered.....                      |         |                             | 11c       |

**BOSTON.**

(Reported by Macomber, Bigelow & Downe, 176 to 18 Oliver St.)

|   |                      |        |
|---|----------------------|--------|
| <b>Anvils</b> —Single American.....                 | per lb. 10c;         | dis 15 |
| <b>Ases</b> —Blue Jacket.....                       | 11                   | 10     |
| <b>Boys' Handled Blue Jacket</b> .....              | 11                   | 10     |
| <b>Axe Handles</b> —Wadleigh's Oak-<br>A Extra..... | C (No. 2) \$1.50     | \$5.00 |
| <b>Blind Hinges</b> .....                           |                      |        |
| <b>Blind Nuts</b> .....                             | per hundred sets \$5 | 50     |
| <b>Oil or Washburn's</b> .....                      | per hundred set \$5  | 50     |
| <b>Bores</b> —Best Horns.....                       | dis 60               | 60     |
| <b>Bores</b> —Best Horns.....                       | dis 60               | 60     |
| <b>Bores</b> —Angie, Backs.....                     | dis 30               | 30     |
| <b>Bores</b> —Angie, Backs.....                     | dis 30               | 30     |
| <b>Common, Shell &amp; quality</b> .....            | dis 3                | 3      |
| <b>Brass</b> —Barber's.....                         | dis 4045             | 45     |
| <b>Spofford's</b> .....                             | dis 50               | 50     |
| <b>Brackets</b> —Star Bronze.....                   | dis 10               | 10     |
| <b>Star-Jagged</b> .....                            | dis 50               | 50     |
| <b>Star Shelf</b> .....                             | dis 10               | 10     |
| <b>Brass Faucets</b> —L. F. & M.....                | dis 25               | 25     |
| <b>Brass Horns</b> —Patent Metal.....               | dis 10               | 10     |
| <b>Butts</b> —Union Drilled Loose Joint.....        | dis 65               | 65     |
| <b>Wire Fast Joint</b> .....                        | dis 25               | 25     |
| <b>Brass Butts</b> .....                            | dis 30               | 30     |
| <b>Wrought Fabric Butts and Back</b> .....          | dis 30               | 30     |

|                                       |   |
|---------------------------------------|---|
| Wrought Iron Butts.....               | Reduced, dis 30                         |
| Cars.....                             |   |
| Card, No. X, per doz.....             | 40 15                                   |
| Horn " No. X, ".....                  | 40 30                                   |
| Wool " No. 5X, ".....                 | 40 15                                   |
| Cartridges.....                       | 250                                     |
| Cartridges—U. S. Cartridge Co.....    | 40 15                                   |
| Chisels—" Buck Bros. Blank Goods..... | and 25                                  |
| Socks.....                            | 250                                     |
| Chairs.....                           | 250                                     |
| Redheifer patent.....                 | 5 6 gal                                 |
| Compasses and Dividers.....           | per doz \$22 00 \$24 00 \$31 50 \$36 00 |
| P. S. & W.....                        | 40 15                                   |
| Cordage—Manila (usual trade).....     | 15 10                                   |
| " American Tarred Hemp Lath 1 in..... | 15 10                                   |
| Cordage.....                          | per doz 15 10                           |
| Crow Bars—Iron, Steel Points.....     | 15 10                                   |
| Sweet Steel Bars.....                 | 15 10                                   |
| Barbed Wire.....                      | 15 10                                   |
| K. F. & Co. Extra Iron Steel.....     | 15 10                                   |
| Cow Ties.....                         | 15 10                                   |
| Dividers—Cook's Nicke Plated.....     | 15 10                                   |
| Per doz.....                          | 15 10                                   |
| Per doz.....                          | 15 10                                   |
| Torrey.....                           | 15 10                                   |

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|   |        |        |
|---|--------|--------|
| 5. Ace Pattern.....                         | .....  | \$1.00 |
| 6. Broom (No. 2).....                       | \$2.75 | \$1.00 |
| 7. Broom (No. 3).....                       | \$2.75 | \$1.00 |
| 8. Ace Pattern.....                         | .....  | \$1.00 |
| 9. Hinges—Straut and T. Stanley Works.....  | .....  | \$1.00 |
| 10. Hinges—Straut and T. Stanley Works..... | .....  | \$1.00 |
| 11. Wrought Screw Hook.....                 | .....  | \$1.00 |
| 12. Knobs—Young's Imp. Silver Glass.....    | .....  | \$1.00 |
| 13. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 14. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 15. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 16. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 17. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 18. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 19. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 20. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 21. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 22. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 23. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 24. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 25. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 26. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 27. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 28. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 29. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 30. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 31. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 32. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 33. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 34. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 35. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 36. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 37. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 38. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 39. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 40. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 41. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 42. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 43. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 44. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 45. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 46. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 47. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 48. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 49. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 50. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 51. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 52. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 53. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 54. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 55. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 56. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 57. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 58. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 59. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 60. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 61. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 62. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 63. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 64. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 65. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 66. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 67. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 68. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 69. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 70. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 71. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 72. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 73. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 74. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 75. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 76. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 77. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 78. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 79. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 80. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 81. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 82. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 83. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 84. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 85. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 86. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 87. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 88. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 89. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 90. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 91. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 92. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 93. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 94. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 95. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 96. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 97. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 98. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 99. Lumber—Tubular No. 6.....               | .....  | \$1.00 |
| 100. Lumber—Tubular No. 6.....              | .....  | \$1.00 |

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|                     |                                  |                |
|---------------------|----------------------------------|----------------|
| Nervex              | -Am. Screw Co., new lat Sept.    | du 55 50       |
| Allen's             |                                  |                |
| Scrible Stakes      |                                  |                |
| Wrigley's "No. 1"   | first quality                    | \$ gross 87 50 |
| "No. 2"             | second quality                   | 94             |
| Shovel              | O. Ames                          | du 25 50       |
| B & D               |                                  | du 25 50       |
| Mirrored            | Price 6c                         | du 12 50       |
| Spending Pliers     | W. C. & Co.                      | du 15 50       |
| Stone Pickers       | Partridge, original              | do 15 50       |
| "Patented"          | do                               | do 15 50       |
| Traps               | Onesida                          | du 25 50       |
| Blacks              |                                  | du 30 50       |
| Vices               | J. & Co.'s Solid Box Blacksmith  | du 15 50       |
| "Sawing Parallel"   |                                  | du 15 50       |
| Bucks               |                                  | du 15 50       |
| "Howard's Parallel" |                                  | du 15 50       |
| Weather Hooks       | Wire to drive                    | du 15 50       |
| Weather Strips      | "Harrison"                       | per doz 10 10  |
| Weights             | Window Weights                   | \$ 15 50       |
| Wedge               | Axe                              | du 35 50       |
| Wire                |                                  |                |
| Eureka              | In spools, No. 25 to 40 assorted | \$ gross 43 50 |
| Wire Netting        | Climax Wire Cloth Co.            | du 50 50       |
| Drab of black       | "Climax Wire Cloth Co."          | du 50 50       |
| Wrenches            | Genuine Wrenches, O. J. Connell  | du 40 50       |
| Walton              |                                  | du 50 50       |

|   |             |                 |                |
|---|-------------|-----------------|----------------|
| Wingers—  |             |                 |                |
| Norway  | .....       | 100 doz or more | \$75 00        |
| and Universal   | .....       | 10 doz or more  | 80 00          |
| .....   | .....       | 3 doz or more   | 85 00          |
| B.....  | .....       | 98 00           | 96 00          |
| C.....  | .....       | 114 00          | 111 00         |
| Eureka  | .....       | 60 00           | 58 00          |
| Wilmington, Cooley & Co.....  | .....       |                 | dis 50         |
| Hoe, makers, Forks, etc.....  | .....       |                 | dis 50         |
| <b>Boston Metal Market.</b>   |             |                 |                |
| (Corrected by Fuller, Dana & Felt, 110 North Street, Boston, Importers and Commission Merchants.) |             |                 |                |
| April 1, 1876   |             |                 |                |
| <b>Iron.—Best Re-rolled</b>   | <b>Iron</b> | <b>1 ton</b>    | <b>\$42 00</b> |
| "Burdens Best"  | .....       | 94              | 94 00          |
| Swedish Bar   | .....       | 100             | 100 00         |
| Norway Slaps  | .....       | 100             | 100 00         |
| Norway Nail Iron  | .....       | 100             | 100 00         |
| Sheet Iron  | .....       | 100             | 100 00         |
| "Galvanized"  | .....       | 100             | 100 00         |
| "Russian"   | .....       | 100             | 100 00         |
| Pig Iron  | .....       | 100             | 100 00         |
| Iron Balls  | .....       | 100             | 100 00         |
| Steel Balls   | .....       | 100             | 100 00         |
| Pig Iron, Foundry   | .....       | 100             | 100 00         |
| "No 2 extra   | .....       | 100             | 100 00         |
| "Gray Forge   | .....       | 100             | 100 00         |

|  |       |        |
|--|-------|--------|
| Wrought Scrap Iron.....                              |       | \$9 00 |
| Old Rails .....                                      |       | " "    |
| <b>Steel.</b> .....                                  | ¢     |        |
| Eng. Tool, gold .....                                | 35 50 |        |
| American Tool .....                                  | 11 c  |        |
| " March .....  | 65 c  |        |
| Bessemer .....                                       | 65 c  |        |
| <b>Tin Plates.</b> —# box Rld<br>I C. No. 1034 ..... | 87 00 |        |
| I C. Coe 1034A .....                                 | 65 00 |        |
| Coe Roof. I C. 1x20, 7 00                            |       |        |
| Coast " I C. 1X20, 6 40                              |       |        |
| <b>Pig Tin.</b> .....                                | ¢     |        |
| Hutch .....  | 25c   |        |
| Swedish .....  | 11 c  |        |
| English .....  | 11 c  |        |
| German .....   | 9 c   |        |
| <b>Spring.</b> .....                                 | 7 c   |        |
| Tire .....   | 7 50  |        |
| Sledging Shovel .....                                | 15 c  |        |
| The Talk .....                                       | 7 c   |        |
| <b>Copper.</b> .....                                 |       |        |
| Sheet .....  | 25 00 |        |
| Bolt .....   | 25 00 |        |
| Sheathing .....                                      | 25 c  |        |
| <b>Lead.</b> .....                                   |       |        |
| Sheet .....  | 7 75  |        |
| Pipe .....   | 8 00  |        |
| Zinc-coated, # 16 10                                 |       |        |
| <b>Spelter.</b> .....                                |       |        |
| Antimony, # 16 10                                    |       |        |

## ST. LOUIS.

Corrected weekly by Semple, Birge & Co.  
**Apple Parers.**—Conqueror.....\$ 402, \$7 75  
 Hudson's Return.....

|  |            |            |
|--|------------|------------|
| "Xen."—Wm. Mann  | .....      | \$7        |
| "C. Marshall"  | .....      | 9 25       |
| Hendrie,   | .....      | \$5 Extra  |
| Doubie & Co.,  | .....      | 10 50      |
| H. L. B. & Co.'s, L. & Co.   | .....      | 19 50      |
| Pioneer  | .....      | 10 25      |
| James & Co.,   | .....      | 9 50       |
| Hunt's,  | .....      | 17 00      |
| Axles.—James Henry & Co.'s Patent Lubricating Half Patent, Swelled Taper, Plain Taper, and Conical Axle, ..... | dis 15 &   |            |
| Common Axies (Pat. Lubricating)  | .....      | and upward |
| Bells.—"Big Inch."   | .....      | \$6 Cts.   |
| Bells.—"Flyer, Church, School and Farm Bells," w/o   | .....      | in c.      |
| "Improved Amalgam, Bronzed," 16 in. B-00.  | .....      | 20 00      |
| Belling.—"Boston Belling Co., Boston," 8 in. B-19.   | .....      | 27 00      |
| Bredford & Sharp's "Oak-Tanned Leather," dis 30 %  | .....      |            |
| Bulls.—American Lion Brand, Bone's Pat., new flat net  | .....      | 10 00      |
| Bulls.—Arms, Bell & Co.'s Machine  | .....      | 40 00      |
| Butts, Bell & Co.'s Machine  | .....      | 40 00      |
| Butts.—Western Butt Co.'s new list—  | .....      |            |
| Narrow Flat Joint, .....   | dis 2 50 & |            |
| Broad Flat Joint, .....  | dis 3 50 & |            |
| Loose  | .....      | dis 4 50 & |
| Reynolds   | .....      | dis 4 50 & |

|  |       |                 |
|--|-------|-----------------|
| Joel, Jacob and Silver                               | ..... | 45 1/2          |
| Loose Joint "Acorn"                                  | ..... | 45 1/2          |
| Churns—Julian, No. 2, 8710; No. 3, 8730; No. 4, 8750 | ..... | 45 1/2          |
| Cider Mills  | ..... | 20              |
| American Senior, \$30.00; Am Junior, \$19.50         | ..... | not             |
| Corn Drill—Campbell's Patent                         | ..... | each 3          |
| Corn Reelers—Diamond Mfg. Co.                        | ..... | not 3           |
| Seymour Mfg. Co.'s Solid Steel Back                  | ..... | 4 00            |
| Corn Shellers—Sandwich Mfg. Co.                      | ..... | 10              |
| Power Shellers                                       | ..... | Special rates   |
| Hand Shellers  | ..... | 10 1/2          |
| Cotton Gins  | ..... |                 |
| Carver, with H in Saws, \$450 a Saw                  | ..... | dis 25 1/2      |
| 12 in. Saws  | ..... | dis 17 1/2      |
| Crow Bars—Steel Pointed                              | ..... | 10 1/2          |
| Crug Saw Machines                                    | ..... | 10 1/2          |
| Robinson's Patent Sweet Corn Press                   | ..... | 4 00            |
| Fanning Mills—Nash & Cutt's                          | ..... | dis 20 1/2      |
| Feed Cutters—Improved Barick National                | ..... | dis 20 1/2      |
| Files, Black—Diamond Mill                            | ..... | 0 64            |
| ..... Bastard  | ..... | 5 1/2 curren 97 |
| ..... Taper  | ..... | 5 1/2 curren 97 |
| Forges—Keystone Portable Forge Co.                   | ..... | dis 12 1/2      |
| Forks and Hooks                                      | ..... |                 |

|   |                 |
|---|-----------------|
| Aurum Mfg. Co.'s Flaw and Manure Forks..... | dts 8 7/8       |
| " " " " " " " " " " " " " " " " " "         | " do 9 1/8      |
| Garden Seed Drills and Wheel Hoes.....      | dts 15 %        |
| Allan's Double Wheel Hoe.....               | dts 15 %        |
| " " Planet Drill, Nos. 2 and 3.....         | dts 15 %        |
| " " Corned Disk Hoe.....                    | dts 15 %        |
| Grinding Mills.—Challenge Feed Mill.....    | dts 15 %        |
| Sedgebeck's Nonpareil Mill.....             | dts 15 %        |
| Braconer's Fresh Bait Hammer.....           | lwt 16 1/2      |
| Hammers.—Massena Hammer.....                | dts 15 %        |
| Smith's Hand.....                           | 20c             |
| Handles.—No. 1 Fork, Hoe and Isake.....     | dts 25 c        |
| " " " " " " " " " " " " " " " " " "         | dts 25 c        |
| Harrow Teeth.—1-inch Iron.....              | dts 8 1/2       |
| % and % inch Iron.....                      | 45c             |
| Iron or Cranked.....                        | % extra         |
| Nay and Cady's Patent Presses.....          | % extra         |
| Dedericks' Railroad.....                    | net lat         |
| " Perpetual.....                            | net tin         |
| Nay Nickel.....                             | " "             |
| Dunn Edge Tool Co.,.....                    | % dgs \$12 00   |
| Lighting; Weymouth's Patent.....            | \$20 00 ea      |
| Horse Hay Fork.—Sells' Improved.....        | \$8-50 each net |
| " " " " " " " " " " " " " " " " " "         | do rate         |
| National Patent Pointed, extra Iron.....    | do rate         |
| Horse Powers.—Pitts or Carey's Patent.....  | dts 10 %        |
| Railway Rails.....                          | dts 10 %        |
| Sandwich.....                               | dts 10 %        |

|  |                          |               |
|--|--------------------------|---------------|
| <b>Horse Hoof</b>  |                          |               |
| Inchide India .....                                      | (Perkin's Pattern) ..... | 7 keg, \$5 70 |
| " "  | " "                      | " " " 8 50    |
| " "  | Trotting Shoes .....     | " " " 9 00    |
| Tredgeer Horse .....                                     | " "                      | per keg 4 25  |
| " Mule .....   | " "                      | per keg 9 70  |
| <b>Hoof-</b>   |                          |               |
| Boston Belting Co.'s Rubber Medium Sizes, 12x10&12 ..... |                          |               |
| " " " Small sizes, Hy- .....                             |                          |               |
| <b>Mattacks -not grub Hoof</b>                           |                          |               |
| Klein, Logan & Co.'s Mattacks .....                      | per doz \$11 75 @ 10 50  |               |
| " " " Grub Hoof .....                                    |                          |               |
| " oval eye .....   |                          | \$ 20 @ 9 70  |
| <b>Money Drawers-</b>                                    |                          |               |
| Pierpont & Co.'s Excelcor .....                          | per doz \$50 @ net       |               |
| <b>Nails.</b>  |                          |               |
| " " " Beeline Riveting Band .....                        | \$7 50 each              |               |
| Package -Boston Belting Co.'s Ironbar, 16" .....         |                          |               |
| Boston Belting Co.'s Ironbar, Pure .....                 | doz \$2 50               |               |
| " " " No 2 Plain .....                                   | doz 40%                  |               |
| " " " Round and Square .....                             | doz 10&12 50             |               |
| <b>Picks.-</b>   |                          |               |
| Railroad and City .....                                  | per doz \$5 50 @ 8 00    |               |
| Coal .....   | " " " 7 40 @ 8 00        |               |
| " " " Point .....  | " " " 11 00 @ 18 85      |               |
| " " " Strong .....                                       | " " " 14 00 @ 18 85      |               |
| Tamping .....  | " " " 14 75 @ 18 85      |               |

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|  |       |            |       |                   |
|--|-------|------------|-------|-------------------|
| Grain Scoops—Patent Cord Straps H. M. M. & Co. | ..... | dis 30     | ..... | 25c per doz extra |
| do. O. Alvord & Co.                            | ..... | dis 30     | ..... | 25c per doz extra |
| do. O. Ames & Son, dis 17 1/2 and 5c           | ..... | .....      | ..... | .....             |
| Sledges.—Smith's Stone or Coal Sledge          | ..... | dis 15     | ..... | .....             |
| do. Solid Cast Steel                           | ..... | dis 15     | ..... | .....             |
| do. Solid Cast Steel                           | ..... | dis 15     | ..... | .....             |
| Snaths and Cradles.—Beymour Mfg. Co.'s         | ..... | dis 20     | ..... | .....             |
| Sorghum Machinery.—Bell Cent. Mch. Co.         | ..... | dis 20     | ..... | .....             |
| Scuttlins—Sears & Roebuck's                    | ..... | dis 20     | ..... | .....             |
| Spring.—Cleveland Spring Co.                   | ..... | dis 18 1/2 | ..... | .....             |
| Carriage and Express                           | ..... | dis 12 1/2 | ..... | .....             |
| do. Springs                                    | ..... | dis 12 1/2 | ..... | .....             |
| Thimble Saws—Whitewater                        | ..... | dis 15     | ..... | .....             |
| Vases.—Solid Box                               | ..... | dis 15     | ..... | .....             |
| Wagon Mfg. Co.'s                               | ..... | dis 15     | ..... | .....             |
| do. Wagon Mfg. Co.'s                           | ..... | dis 15     | ..... | .....             |
| Champion Wood Wheel                            | ..... | dis 20     | ..... | .....             |
| do. Garden                                     | ..... | dis 20     | ..... | .....             |
| Wrenches.—Co's Genuine                         | ..... | dis 20     | ..... | .....             |
| do. Co's Pattern                               | ..... | dis 20     | ..... | .....             |
| Wagons.—Whitewater Farm Wagon                  | ..... | dis 20     | ..... | .....             |
| Thimble Skew                                   | ..... | dis 15     | ..... | .....             |
| Iron Axle                                      | ..... | dis 15     | ..... | .....             |

### St. Louis Metal Market.

(Corrected Weekly by Messrs. H. Sallis & Co.)  
**Tin Plate.**

[illegible]

|                                |      |      |      |             |
|--------------------------------|------|------|------|-------------|
| No. 25 to 34.....              | 1 c  | 4½ c | 5½ c | 7½ c        |
| No. 35 to 44.....              | 1½ c | 4½ c | 5½ c | 7½ c        |
| No. 45 to 54.....              | 1½ c | 5 c  | 5 c  | 8 c         |
| No. 55 to 64.....              | 1½ c | 5½ c | 5½ c | 8½ c        |
| Galvanized Sheet Iron.....     |      |      |      | dis 30 c    |
| Iron Rivets.....               |      |      |      | dis 25 c    |
| Iron Wire.....                 |      |      |      | dis 40 c    |
| Copper Rivets and Nuts.....    |      |      |      | dis 30 c    |
| Genuine Russia Iron.....       |      |      |      |             |
| Perfect—No. 8, 10, 11, 12..... |      |      |      | per lb. 16c |
| Stained—No. 8, 10, 11, 12..... |      |      |      | per lb. 12c |





## TO ALL WHO USE STEAM-POWER!

We will put our Governor on any Engine, and guarantee it to prove itself superior to all others. If, after a fair trial, it does not, we will take it off at our own expense.

**Shive Governor Co.**  
BETHLEHEM, PA.

SHIVE'S PATENT WATCHMAN'S CLOCK AND DETECTOR,

Buoy's Patent Counter Scale,  
No Nest of Weights.

Circulars sent free

## THE JUDSON GOVERNOR.

It is a common method to advertise Governors without cost, unless satisfactory to the customer, and then charge High Prices for doing what any good Governor will do. Various Governors inferior to the "Judson" are sold in this way, operating well enough for three months, to insure collection of the pay, but becoming useless after a year's wear—their construction lacks durability. The Judson Governor is guaranteed to be not only the best Regulator of Steam Engines, but also the most durable Governor made. Parties in buying other Governors should stipulate that their durability be guaranteed, and should also take care that they do not, for much inferior Governors, pay higher prices than those shown in the accompanying list. We guarantee the Judson Governor will do all any other Governor can do, and in Accuracy and Durability—the main essentials—we guarantee it shall do more.

## Reduced Price List, JANUARY 25th, 1876.

For dimensions of Governor, see Illustrated Price List.



THE JUDSON PATENT

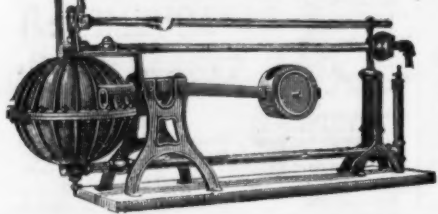
Improved Steam Governor.

No Charge for Boxings & Cartage.

JUNIUS JUDSON & SON, Rochester, N. Y.

| Size, Inch. | Plain.  | Bright. | Extra. | Stop Valve. |
|-------------|---------|---------|--------|-------------|
| 1/2         | \$17.00 | \$19.00 | \$1.90 | ..          |
| 3/4         | 19.00   | 21.00   | 2.00   | ..          |
| 1           | 21.00   | 23.00   | 2.25   | 6.00        |
| 1 1/4       | 25.00   | 27.00   | 2.50   | 8.00        |
| 1 1/2       | 29.00   | 31.00   | 2.75   | 10.00       |
| 2           | 35.00   | 37.00   | 3.00   | 12.00       |
| 2 1/2       | 42.00   | 44.00   | 3.25   | 14.00       |
| 3           | 45.00   | 47.00   | 3.50   | 15.00       |
| 3 1/2       | 49.00   | 51.00   | 3.75   | 17.00       |
| 4           | 55.00   | 57.00   | 4.00   | 20.00       |
| 4 1/2       | 64.00   | 66.00   | 4.50   | 25.00       |
| 5           | 74.00   | 76.00   | 5.00   | 30.00       |
| 5 1/2       | 86.00   | 88.00   | 5.50   | 36.00       |
| 6           | 94.00   | 96.00   | 6.00   | 42.00       |
| 6 1/2       | 110.00  | 112.00  | 6.50   | 48.00       |
| 7           | 125.00  | 127.00  | 7.00   | 54.00       |
| 7 1/2       | 150.00  | 152.00  | 8.00   | 68.00       |
| 8           | 185.00  | 187.00  | 9.00   | 80.00       |
| 9           | 205.00  | 207.00  | 10.00  | ..          |

## The Albany Steam Trap.



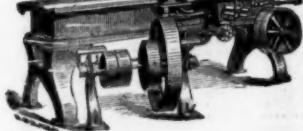
This Trap automatically drains the water of condensation from Heating Coils, and returns the same to the Boiler whether the Coils are above or below the water level in Boiler, thus doing away with pumps and other mechanical devices for such purposes. Apply to

Albany Steam Trap Company,  
Albany, N. Y.

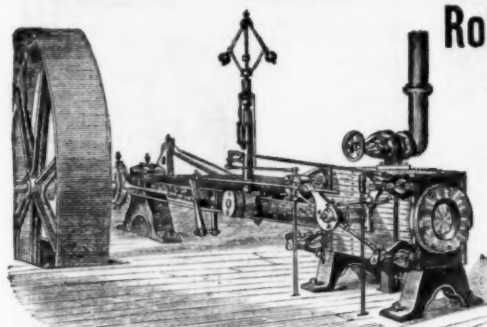
## The Pratt & Whitney Co., Hartford, Conn.,

Have constantly on hand and making

## Drop Hammers



Of recently Improved Construction. Pony Trip Hammers, Blacksmiths' Sheaves, Broaching and Stamping Presses, Iron Shop Cranes, Machinists' Tools, Gun and Sewing Machine Machinery. Make to order Gray and Charcoal Iron Castings of all styles and sizes not exceeding 15 tons weight, (making patterns if desired). Furnish Clamp Pulleys of light patterns, cut gears in a superior manner, &c., &c.



Robt. Wetherill & Co.  
CHESTER, PA.

Corliss Engine  
BUILDERS.

Shafting & Gearing.  
Boiler Makers.

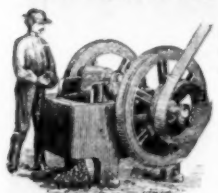
## THORNE, DeHAVEN & CO., Drilling Machines,

21st Street, above Market, Philadelphia.

PORTABLE DRILLS. Driven by power in any direction.  
RADIAL DRILLS. Self-feed—Large Adjustable Box Table.  
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HORIZONTAL BORING AND DRILLING MACHINES.  
HAND DRILLS. CAR BOX DRILLS.  
SPECIAL DRILLS. For Special Work.

## BLAKE'S PATENT STONE & ORE BREAKER.

New Pattern with Important Improvements & Abundant Strength



For reducing to fragments all kinds of hard and brittle substances, such as STONE for making the most perfect MACADAM ROADS, and for making the best CONCRETE. It breaks stone at trifling cost for BALLASTING RAILROADS. It is extensively in use in MINING operations, for crushing

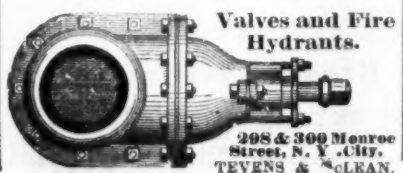
IRON, COPPER, ZINC, SILVER, GOLD, and other ORES.

Also for crushing Quartz, Flint, Emery, Corundum, Feldspar, Coal, Barytes, Manganese, Phosphate Rock, Plaster, Soapstone, &c.  
For Illustrated Circulars, and particulars, address

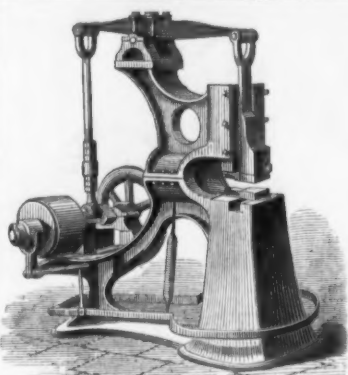
BLAKE CRUSHER CO., New Haven, Conn.



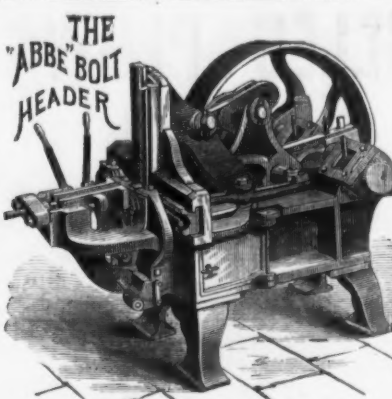
Stevens & McLean  
298 & 300 Monroe St.,  
New York,  
AGENTS.



Valves and Fire Hydrants.  
298 & 300 Monroe Street, N. Y. City.  
STEVENS & McLEAN.



THE PALMER POWER SPRING HAMMER.



Of these Machines we are building sizes to meet the requirements of all Manufacturers and Workers of Iron and Steel. In simplicity, durability, ease of operation, accuracy, and range of work, we guarantee them superior to any Machines of their kind produced in the world. For prices, references, and full descriptive circulars, address

**S. C. FORSAITH & CO.,**  
Manchester, N. H.

## Knowles Patent Steam Pumps

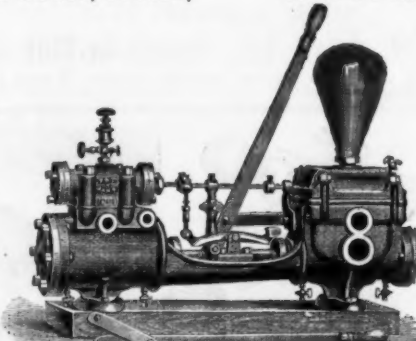
MANUFACTURED BY THE

**KNOWLES STEAM PUMP WORKS,**  
WARREN, MASS.

WAREHOUSES:

14 & 16 Federal Street, Boston,

92 & 94 Liberty Street, N. Y.

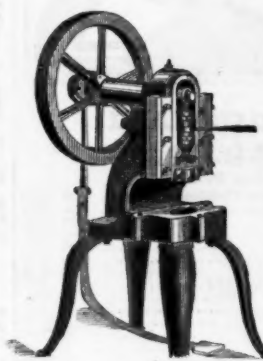


Cut above represents regular Boiler Feed Pump, No. 3 and 4. Showing New Patent Valve Motion, and Hand Power LEVER Attached and Detached.

## FIRE PUMPS a specialty.

Mining Pumps (both Double Acting Plunger, and Piston Pattern,) which we guarantee to run absolutely noiseless on any lift from 100 to 600 ft., at a single lift, a specialty. Pumps for every possible duty. Prices as low as any, and our workmanship and material altogether the Best.

Every machine furnished under a complete guarantee.



**A. H. MERRIMAN,**  
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**Punching Presses.**

Patentee and Sole Manufacturer.

I warrant every part of this Machine to stand the shock of the wheel running at 125 revolutions.

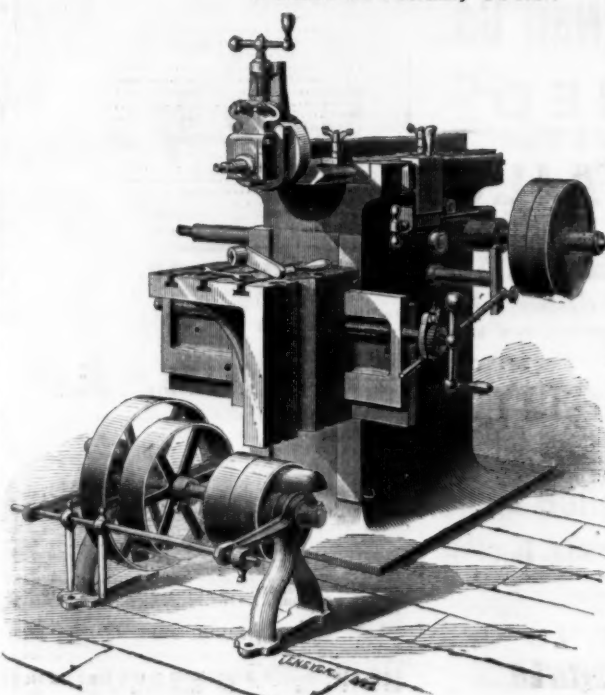
West Meriden, Conn.

Machinery Hall, Philadelphia, Section B 4, Columns 28 and 29.

## THE HENDEY MACHINE CO.

MANUFACTURERS OF

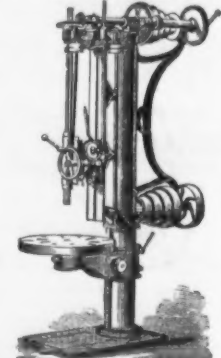
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Patent Planers and Shaping Machines.  
WOLCOTTVILLE, CONN.



Any length of stroke from 3/4 to 24 inch in length, while machine is running with perfect uniformity of speed of cutting tool. Automatic cross feed of 19 inch and 16 inch, from top of table to bottom of slide when table is down. Send for Circular and Price List.

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"BLAISDELL" UPRIGHT DRILLS  
And other First-Class Machinists' Tools.

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DEALERS IN ALL KINDS OF

**Lubricating Oils.**

West Virginia Lubricating Native Rock Oil! Used by most of the Railroads in the United States, Canada and Europe, and by Mechanics on all kinds of Machinery. The safest, Cheapest and Most Reliable Lubricator in the world. Obtained the Highest Prize at the Paris Exposition. 28, 29, 30 and 31 Gravity. No. 28 CEDAR STREET, NEW YORK.



The Whitmore Engine.

SAFEST, CHEAPEST & BEST.

Lovegrove & Co.,  
No. 121 South Fourth Street,  
PHILADELPHIA, PA.

Sole Manufacturers  
Engines, Boilers and  
Steam Pumps.

## The Almond Drill Chuck

THE BEST DRILL CHUCK IN  
THE MARKET.



Is Simple in Construction, Self Centering and very Strong.

Will hold, with a perfectly tight grip, from 5-16 to 0, and weighs but 12 oz.

Price, \$5.00 each.

Liberal discounts to the trade.

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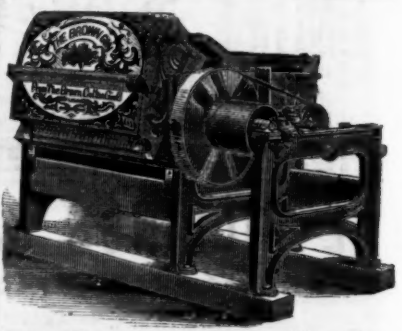
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## OHL & HAUSCHILD, Engineers & Machinists

And manufacturers of

Lathes, Shapers, Slotters, Planers, Gear Cutters, Drill and Power Presses, Pullers, Hangers and Shafting, Machinery and Machinists' Tools in general.

57, 59 & 61 Nassau Avenue,  
Kearney (East Newark), N. J.



The Brown Cotton Gin Co.

NEW LONDON, CONN.

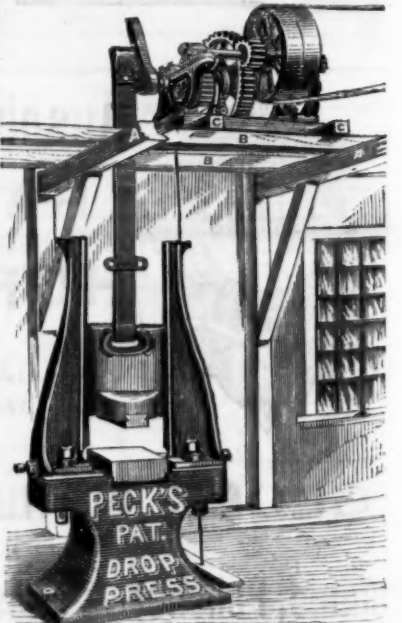
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**COTTON GINS,**

With or without

Self-Feeding Attachment & Condenser.

Cotton Gin Saws, Ribs and other Gin materials. Also Albertson's Segment Screw Cotton, and Hay Press. Send for Circular.



I have the largest and best stock of Drop Press Patterns in the country—suitable for Forging, and all kinds of Sheet Metal work.

WHY THE BEST?

It requires less power, works faster, gives a harder blow with same weight of hammer, the rebound of the hammer is caught without lessening the force of the blow, the blow is uniform and not affected by variations in the speed of the driver. It is always in order. The Drop Press a specialty.

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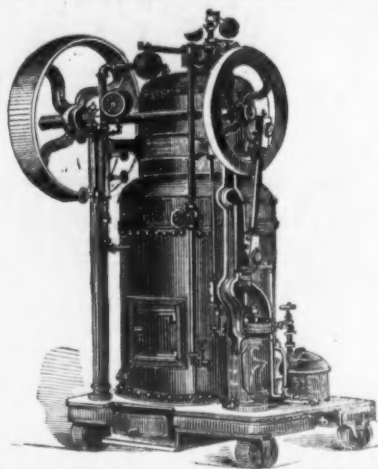
Patented Feb. 10, 1874.

COMPACT,  
PRACTICAL,  
DURABLE,  
ECONOMICAL.

\$200.00.

Cheaper than any Engine offered of  
the same capacity.

MANUFACTURED BY

SHAPLEY & WELLS,  
Binghamton Iron Works,  
Binghamton, N. Y.Manufacturers of Steam Engines, Boilers, Water Wheels, Circular Saw Mills and  
Mill Work generally.

## BUSH HILL IRON WORKS,

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Engineer, Machinist, Founder and Boilermaker

CASTINGS of every description.

ROLLING MILL AND FURNACE EQUIPMENTS COMPLETE

Rolls Turned for Rails, Beams, Angles, and all shapes for Iron, Steel, or  
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TANK AND PLATE IRON WORK.

## Machinery, &amp;c.

Established 1848.

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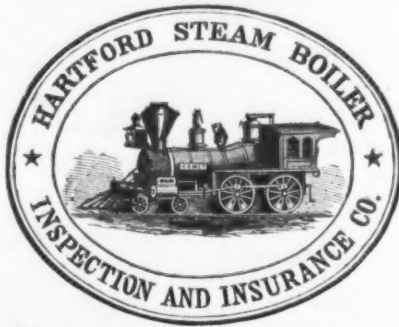
Engineers, Iron Founders and Machinists.

RAILWAY SHOP EQUIPMENTS.

Our Steam Hammers, Lathes, Planers, Drills and Bolt Cutters  
Are of Improved and Patented Construction.Railway Turning and Transfer Tables,  
SHAFTING & MILL GEARING, a specialty.

## Pivot Bridges.

GIFFARD'S INJECTOR--IMPROVED, SELF-ADJUSTING.



Issues Policies of Insurance after a careful inspection of the Boilers

COVERING ALL LOSS OR DAMAGE TO

Boilers, Buildings and Machinery,

ARISING FROM

## STEAM BOILER EXPLOSIONS.

The Business of the Company includes all kinds of STEAM BOILERS

Full information concerning the plan of the Company's operations can be obtained at the

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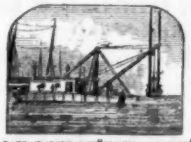
or at any Agency.

J. M. ALLEN, Pres. W. B. FRANKLIN, Vice-Pres. J. B. PIERCE, Sec.

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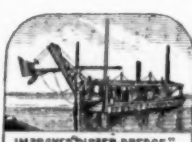
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PATENT IMPROVED GRAPPLE DREDGE



SAWMY PATENT POWERFUL DREDGE



IMPROVED DIPPER DREDGE

BUILDERS OF STEAM DREDGING MACHINES,  
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CONTRACTORS FOR

IMPROVING RIVERS AND HARBORS,  
EXCAVATING CANALS,  
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## Keystone Pressure Blowers.

Anti-friction and noiseless; maximum blast and minimum power;  
all sizes for

Forges, Foundries, Rolling Mills, &amp;c.

## KEYSTONE EXHAUST BLOWERS.

Made on same principle,

For Ventilating Mines, Buildings, etc.; Removing Dust,  
Shavings, etc.; Drying Wool, Lumber, etc. Every  
Blower guaranteed. Send for circular, or  
call and see them in operation.KEYSTONE PORTABLE FORGE CO.,  
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BLE FORGES, for all classes of work, from the lightest to the heaviest.

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No. 24 Columbia Street, New York,

MAKER AND PATENTEE OF

## Hydraulic Jacks and Punches,

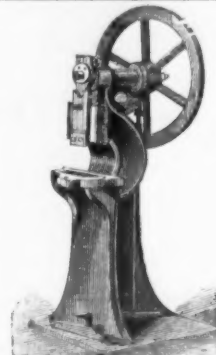
ROLLER TUBE EXPANDERS

And Direct-Acting Steam Hammers.

Communications by letter will receive prompt attention.

JACKS for Pressing on Car Wheels or CRANK PINS made to order

## Machinery, &amp;c.



## REPORT OF JUDGES

In Department V, Group 3, at the 44th  
Exhibition of the

AMERICAN INSTITUTE,

Held in the City of New York, Oct., 1875.

No. 318, Drawing, Drop &  
Punching Presses.THE STILES & PARKER PRESS CO.,  
Of Middletown, Conn.The machinery exhibited by these makers is of a  
character that calls for special commendation. In  
addition to their well known punching presses, to  
which a new feature has been added in a press ad-  
justable to an inclination for discharging work left  
above the die, there are exhibited by them a com-  
bined punch and shears, a drawing or blanking press,  
and a drop.In all these there is shown the highest mechanical  
culture, applied to meet every practical requirement,  
to avoid every practical difficulty, and to enlarge the  
range of application of the machines, by devices  
which are at once simple, elegant, and effective.  
Your committee would unhesitatingly recommend  
for this exhibition the "Medal of Progress," but  
finding such award debarr'd by the rule of the Institute,  
forbidding such award unless a Silver Medal has  
been previously awarded. We, therefore, respect-  
fully recommend the award of a Silver Medal.

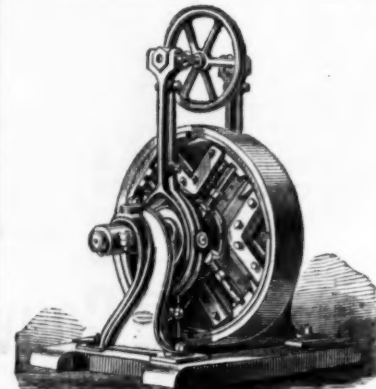
Silver Medal Awarded.

A true copy from the Report on file.

JOHN W. CHAMBERS, Sec'y.

AQUOMETER  
Steam Pump.Highest Premium awarded by  
Franklin Institute, 1874.For Simplicity, Economy of  
Construction & Efficiency.An absolutely Durable, Cheap, Efficient and Eco-  
nomical Steam Pump. Requires no special care or  
lubricating. Warranted. Address for circular,AQUOMETER STEAM PUMP CO.,  
10 South Dela. Avenue, Philadelphia.

## EUREKA SAFETY POWER!

Practically impossible to  
explode. Tested to 30 lbs.  
pressure per square inch. Will  
lift 2 inch seasoned oak—grind 5  
bushels Corn per hour. Price  
\$250. Also, Stationary Engines  
and Boilers and Spark Arres-  
sing Portable Engines for  
plantation use. Send for our cir-  
cular. Discount to the trade.B. W. PAYNE & SONS,  
Corning, N. Y.

## VOLNEY W. MASON &amp; CO.,

Manufacturers of PATENT

## FRICTION PULLEYS,

Friction Clutches

For Connecting Shafting and Gearing,

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**Chas. W. Ervien & Bro.**  
IRELAND ST.  
Kensington, PHILAD'A  
BUILDERS OF  
STATIONARY & MARINE  
ENGINES, BOILERS  
SHAFTING, GEARING,  
AND  
MILL WORK  
GENERALLY.  
Special Machinery  
BUILT TO ORDER.

Vertical and Horizontal  
Engines, of New and  
Heavy Designs, from  
2 to 100 H. P. on  
hand, or in pro-  
cess of erection.

CENTENNIAL SPACE:  
Sec. B 9, Column 69, Machi-  
nery Hall.

Visitors invited to in-  
spect our improved method of  
starting engines.

Two First Premiums awarded by Franklin Institute Exhibition of 1874.

**C. VAN HAAGEN & CO.,**  
2341 and 2343 Callowhill Street,  
PHILADELPHIA, PA.

Manufacturers of Latest Improved Machine Tools, Rotary Shapers, two sizes, Iron Planers, all sizes,  
Horizontal Drill Attachments, for upright power drills, Self-feeding Portable Drills, hand or power, Expan-  
sion Boring Bars, live steam, Universal slide rest, for taper work, Twist Drill Sharpening Machines, auto-  
matic and adjustable in every direction. Noiseless Friction Gears, for transmitting up to thirty horse-power.  
Send for Descriptive Circulars.

OVER 300 IN SUCCESSFUL OPERATION.  
The "Dead Stroke"  
Power Hammer  
With Belden's Recent Improvements.

Guaranteed the best in Every Essential. Takes Less Room,  
Less Power, and costs Very much Less for Repairs than any  
other. Send for descriptive circular with names of over 300 using  
them—(to whom we refer.)

**THE HULL & BELDEN CO.,**  
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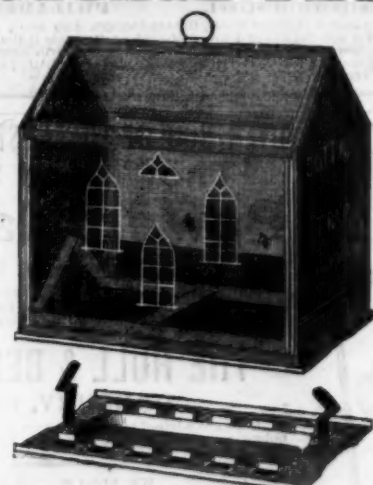
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